Coal Age

FEBRUARY, 1953

A McGRAW-HILL PUBLICATION — PRICE 50c

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Drill Saves 10 to 15c a Ton

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How do YOU haul coal?

With each passing year, the cost of extracting a ton of coal is a greater challenge to efficiency. Costs continue to rise... working days are, at times, spasmodic. This means that a mechanical failure in your underground transportation system—which might cause a complete production shutdown—might prove to be an expensive proposition. But with Mine Cars, this can never happen.

You see, with Mine Cars, if one car needs attention, it's shunted onto a siding. The trip continues rolling... production is maintained. In the days that lie ahead, why not be safe... sure... with 'Constant Haulage' a.c.f. Mine Cars. Ask your nearby a.c.f. Representative for all the facts and production figures. American Car and Foundry Company, New York • Chicago • St. Louis Cleveland • Philadelphia • Huntington, W. Va. San Francisco • Washington • Berwick, Pa.

a.c.f.

MINE CARS

for Constant Haulage

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

B. F. Goodrich cord belt cushions the shock of crashing coal

2 to 6 times the impact resistance of fabric belts

EVERY day hundreds of tons of coal crash down on that belt. Engineers knew an ordinary belt couldn't stand such abuse, so a Caricoal *cord* belt, developed by B. F. Goodrich, was installed. It's already lasted 10 years—old age in this type of service.

This is typical, not an unusual case at all, because the B. F. Goodrich Caricoal cord belt was designed to stand more impact, and so lasts longer. An extra cushion is built into both the top and bottom of the belt. This cushion is a ply of parallel cords running lengthwise. Each cord is completely surrounded by rubber—no cross threads tie them together—so they are free to give as heavy chunks of coal strike the belt. The rubber takes the shock.

As an extra protection against shock and impact, B. F. Goodrich has added a patented *Transcord Breaker*. This extra layer of parallel cords in rubber is placed across belt width and around belt edges. Increases adhesion of cover to carcass by 50%. Keeps cover from tearing off carcass under severe impact. Prevents gouges and cuts from splitting belt cover.

If your belt must take severe impact on loading, and cutting and gouging at the loading chute, you need a Caricoal cord belt. Your nearby B. F. Goodrich distributor can show you how these longer-lasting coal handling belts can cut costs, or write *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Caricoal Conveyor Belts

BY

B.F.Goodrich

RUBBER FOR INDUSTRY

It's Specialized skill
High in the sky the steel worker goes about his job in situations no ordinary man could stand — only his specialized skill stands between him and loss of life.
HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.
Specialists in Coal Mine Lubrication

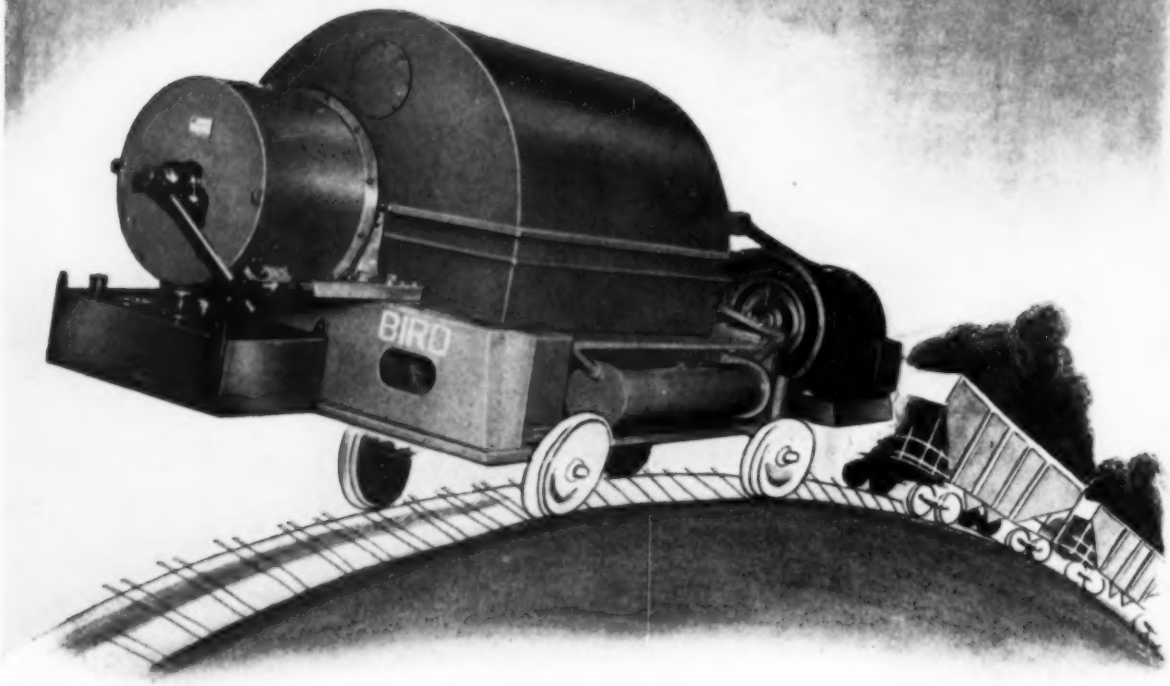
PROTECTS HIS LIFE.....

...and the same applies to Coal Mining Machinery

Hulburt *Quality* GREASE

Have you got sky-high machine operating costs down in your coal mine? Chances are much of it is due to using the wrong lubricant. That situation calls for Hulburt Quality Grease, a specialized product of specialized skill in making exactly the RIGHT grease to protect the life of coal mining machinery.

MAKE THE *GRADE* BETTER
with the
BIRD COAL FILTER



Couple up the BIRD with your preparation plant and it will definitely pull up the grade.

When the Bird Filter is on the job you can introduce rinse water at the right point to free the coal of the clay-like, high ash fines. These are what retain excessive moisture in the coal as well as excessive ash in the finished product.

The slime solids taken out by the Bird contain 30 to 50% ash. They do not belong in the good fine coal, all of which goes into profitable tonnage.

Let us show you just what the Bird can do to help you produce better grade coal and more of it at lower cost.

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS

Coal Age

Will Atomic Energy Replace Coal in Making Electricity?

. . . **NO!** Not in the foreseeable future on a competitive basis, no matter what you read in the newspapers these days. That's the consensus of the experts in *Coal Age's* study of "Coal and the Atom" scheduled for publication in the March issue. In preparing this staff-written analysis of the future of atomic power and its possible effects on coal's markets, we culled a wealth of data and talked to many authorities. Even by the time power can be made from atomic energy on an economic basis, the Nation's power load will have grown so large there will be plenty of room for every possible source of power. Incidentally, if you've wondered how the atomic bomb works, or how to start out to run a power plant with an atom, you'll find the simplified explanations in this article very readable,—and even entertaining.

. . . **And speaking of power,** the government's Bureau of Reclamation says that by 1975 some 55% of the West's electric power will be supplied by coal—an increase of 30 times in the electricity now generated from coal. It goes on to recommend huge power plants located at the mines. For a look into the future, see the story on p 135.

ALSO COMING IN COAL AGE

. . . **And as usual,** *Coal Age* will serve you a big helping of useful, work-tested operating articles and ideas in March and other issues to come—for example, reports on how a big stripper uses new methods of overburden drilling to effect real savings . . . a shuttle-belt loader filling railroad cars without moving them that cuts tipple installation costs . . . how an efficient mechanical-loading mine boosted its output per man even more . . . the step-by-step tricks of practical pump maintenance . . . what electrical diagrams mean and how to use them . . . and so on.

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How to get STARTS FOR YOUR

WINTER AND SUMMER, your best bet for smooth, easy starts is to lubricate mine car wheels with *Texaco Olympian Grease*. That's also your best bet for longer bearing life and lower maintenance costs. Here's why –

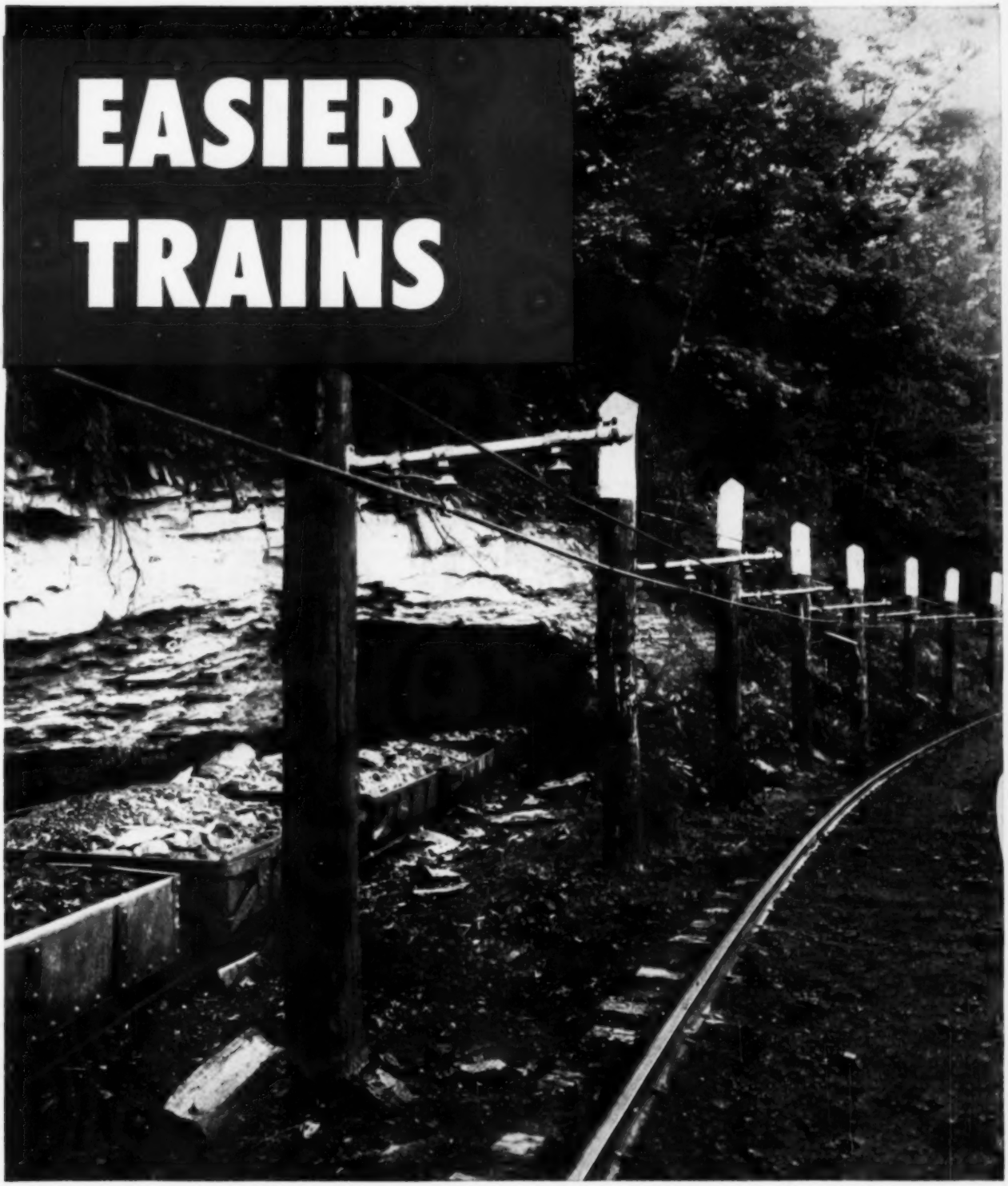
Texaco Olympian Grease stays in the bearings – whether plain, cavity hub or anti-friction. It acts to seal out dirt and moisture. It has notably high resistance to oxidation, and will not separate in use or in storage. *Texaco Olympian Grease* thus assures longer lasting protection. There are three consistencies to cover every requirement.

For high-speed anti-friction bearings, use *Texaco Regal Starfak*. It outperforms ordinary grease in this service . . . stands up throughout a wider temperature range. You get longer bearing life, cut your maintenance costs.

A Texaco Lubrication Engineer will gladly help you get greater efficiency from your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE, on television Tuesday nights. METROPOLITAN OPERA radio broadcasts Saturday afternoons.

TEXACO



LUBRICANTS for the Coal Mining Industry

THE NEW CRAWLER MOUNTED "AUTOMAT"

Offers the same Exclusive Advantages as the famous TRACK MOUNTED WHALEY "AUTOMAT" . . . . . .

The Crawler Mounted Whaley "Automat" has a very simple and efficient crawler mechanism. One of the important features of the Crawler Mounted "Automat" is that it cleans up a width of 24 feet from only one setting of the crawlers. This is highly important because it means the steering and crawler are not excessively used . . . resulting in minimum disturbances of tender or soft bottom. For loading in all classes of material at the lowest possible cost, investigate the Whaley "Automat". Folder No. 2015 gives the details and specifications on the Crawler Mounted Whaley "Automat" loaders, while Folder No. 472 provides specifications on the Track Mounted "Automat" Loaders. MYERS-WHALEY CO., KNOXVILLE, TENN.

SHOVEL ACTION

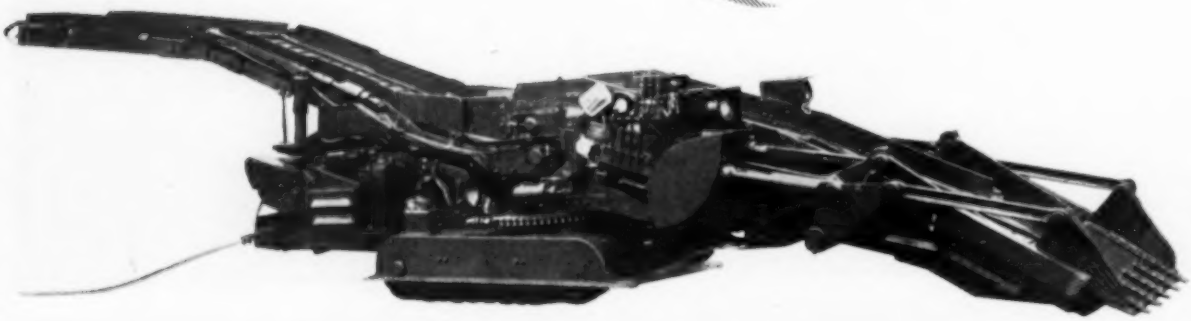
The vital element of a loading machine is the LOADING HEAD. In the Whaley "Automat" a true automatic shoveling mechanism, original and patented, actually shovels the coal or other material onto the conveyor.

LOADS TO CAPACITY

The "Automat" loads maximum height cars in limited head room and loads them to capacity because the rear conveyor is always automatically parallel to top of car.

SAFE LOADING

Because the loading action of the "Automat" is always in a vertical plane, there is no danger of any part of the machine sidekicking. Therefore, when working in close timbering props can be set close to the face. There is no danger of knocking out timbers or crushing workmen.



MYERS-WHALEY COMPANY

MECHANICAL LOADERS EXCLUSIVELY SINCE 1908

BUILT TO TAKE ROCK-SHOCK
Double steel floor is reinforced with heavy oak plank to absorb loading shocks. Front and sides are channel ribbed to provide rigidity. Steering jacks and tires are protected from accidental damage by falling rock.

Allis-Chalmers MOTOR WAGON

built to meet today's high production demands

DUMPS SAFELY . . . CLEANLY — Wheel base remains constant during entire dumping cycle. With this stable wheel base, operator may back to the very edge of a steep fill, set the powerful air brakes on *all four* wheels and put the entire load over the edge.

Clean interior, plus high, 70-degree tilt assures complete load ejection. Body may be heated by exhaust to prevent freezing of materials in severe temperatures.

MULTIPLY TRACTOR USE WITH INTERCHANGEABLE SCRAPER BODY . . . for stripping and other self-loading operations. TS-200 Motor Scraper is a high-speed, rubber-tired unit with 13-yard capacity, "through-the-center" boiling action for easy loading, positive forced ejection and many other high-production features.

Ask your Allis-Chalmers dealer for the full story.

TRAVELS FAST — High horsepower-to-yardage ratio and large, high-traction rock-lug tires give fast average travel speeds — even on adverse grades and heavy going. Delivers more loads per hour; reduces idle shovel time.

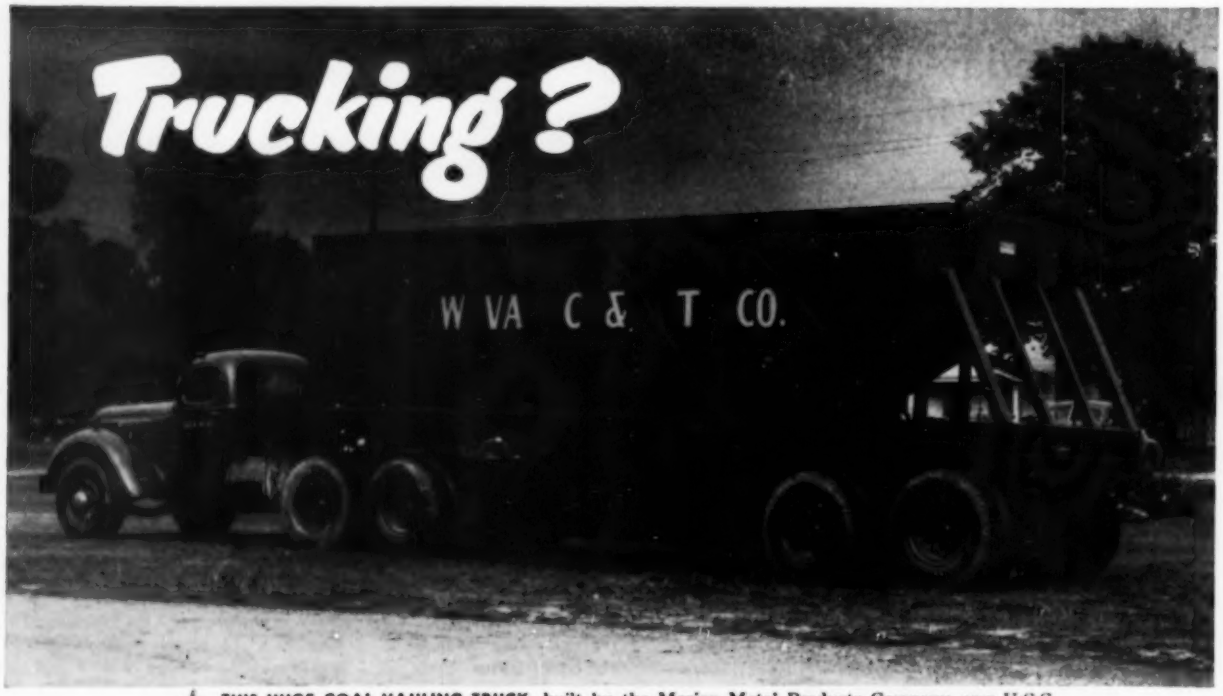
ALLIS-CHALMERS MODEL TR-200 REAR-DUMP MOTOR WAGON

Choice of Engines—165 hp. Cummins; 176 hp. Buda.
Capacity — 15 cu. yd., heaped; 18 tons.
Speeds — Five forward to 21.6 mph.; reverse to 2.5 mph.
Hydraulic steering and dumping.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 9, U. S. A.

★ **FOR MANY YEARS,** the Thew Shovel Company has used U·S·S HIGH STRENGTH STEELS to give their famous LORAIN equipment maximum resistance to abrasion, fatigue and impact with minimum weight.

You can do it better and cheaper



★ **THIS HUGE COAL HAULING TRUCK,** built by the Marion Metal Products Company uses U·S·S COR-TEN steel in its braces and underframing. Although strength is greatly increased, the weight of the vehicle is the same as if ordinary steel had been used.

★ **THE BARBER-GREENE COMPANY** of Aurora, Illinois used U·S·S COR-TEN and U·S·S MAN-TEN steels in this conveyor and crawler-stacker to increase strength and resist wear without increasing weight.

with U·S·S High Strength Steels!

IN FACT, for all mine equipment in which toughness and durability are important, U·S·S HIGH STRENGTH STEELS should be your choice.

Here's why!

U·S·S COR-TEN, U·S·S MAN-TEN and U·S·S TRI-TEN steels give your equipment the stamina to stay on the job. These famous "steels that do more" have a yield point 50% higher than that of ordinary structural steel. With U·S·S COR-TEN steel you can obtain four to six times the resistance to atmospheric corrosion of structural steel. All three of these U·S·S HIGH STRENGTH STEELS have greater resistance than structural steel to fatigue, shock and abrasion. Where ability to withstand abrasion is the principal characteristic desired, U·S·S A-R (Abrasion-Resisting) steel will give longer life.

And what does this mean to you?

In plain dollars-and-cents talk, it means you can increase your profit ratio all the way around. Because of these superior properties, equipment built with U·S·S HIGH STRENGTH STEELS *stays on the job* . . . lasts longer . . . does more work. Maintenance costs are lower . . . replacement costs are lower . . . and output per dollar invested is higher.

With these steels you can give each part of your equipment the particular qualities it needs to do its job best. By replacing carbon steel construction with U·S·S COR-TEN steel, U·S·S TRI-TEN steel, or U·S·S MAN-TEN steel, for example, you can increase the strength of a part without increasing its weight. Or, you can reduce its weight without reducing its strength. With U·S·S TRI-TEN steel you can also insure even greater ability to withstand shock at subzero temperatures. And with U·S·S A-R steel you can provide maximum resistance to wear and abrasion.

Yes, U·S·S HIGH STRENGTH STEELS can increase the performance of your equipment and save you money at the same time. Get all the facts now by writing to our nearest office.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S HIGH STRENGTH STEEL

USS

2-2170

UNITED STATES STEEL

Replaces 7 trucks with 2 Tournarockers on tough coal stripping job

Portion of haul road, showing deep standing water . . . with soft, rutted incline in the distance. Hauling under these tough conditions, the 2 Tournarockers totaled 4,000 hours with 95% mechanical efficiency.

With heaped load, Tournarocker starts 300′ haul to fill. Rig's ability to turn 90° in 13′9″ radius speeds cycle. Says Owner Chapman: "One feature we particularly like about these machines is the way we can turn them around without stopping in our narrow cuts."

H. T. Chapman **of Elkins, West Virginia — stripping 1,500,000 yds. of shale for the Phil Williams Coal Co. near Elkins — has a serious haul problem on his hands. During much of the year working conditions are very bad. Steady rains, combined with poor drainage, continually saturate haul roads and material. At times, parts of the haul must be made through 30″ of water. Access roads are wet, spongy, and practically bottomless in places.**

"Only equipment that can do job"

When it became apparent that dump trucks couldn't work efficiently under these conditions, Chapman tried 2 rear-dump C Tournarockers. With their traction advantages—front-wheel drive, big high-flotation tires and power-proportioning differential (which automatically applies up to 4 times the power of slipping drive-wheel to wheel on firmer ground) — these rigs really did the trick! After several months' use Chapman observed, "Tournarockers are the only pieces of equipment that could do the job. My 2 'C's' have replaced 7 trucks!"

Move 220 yds. of overburden hourly

Company records covering several typical months of stripping show the 2 Tournarockers average 11 cu. yds. (almost 15 tons) of hard blue shale per load. On a soupy 600′ cycle, each rig makes 10 trips per hour . . . hauls 1100 yds. (1500 tons) per 10-hour day.

Also haul coal, 22 yds. per load

The 2 "C's" have also been used to haul coal. On this work, they move about 22 cu. yds. per load. Average 12,000′ cycles are completed every 15 to 20 minutes — in spite of travel through 800′ of belly-deep mud, up 700′ of 16% unfavorable grade and down 200′ of 30% favorable grade. That's 3 to 4 trips (66 to 88 cu. yds.) per hour for each rig.

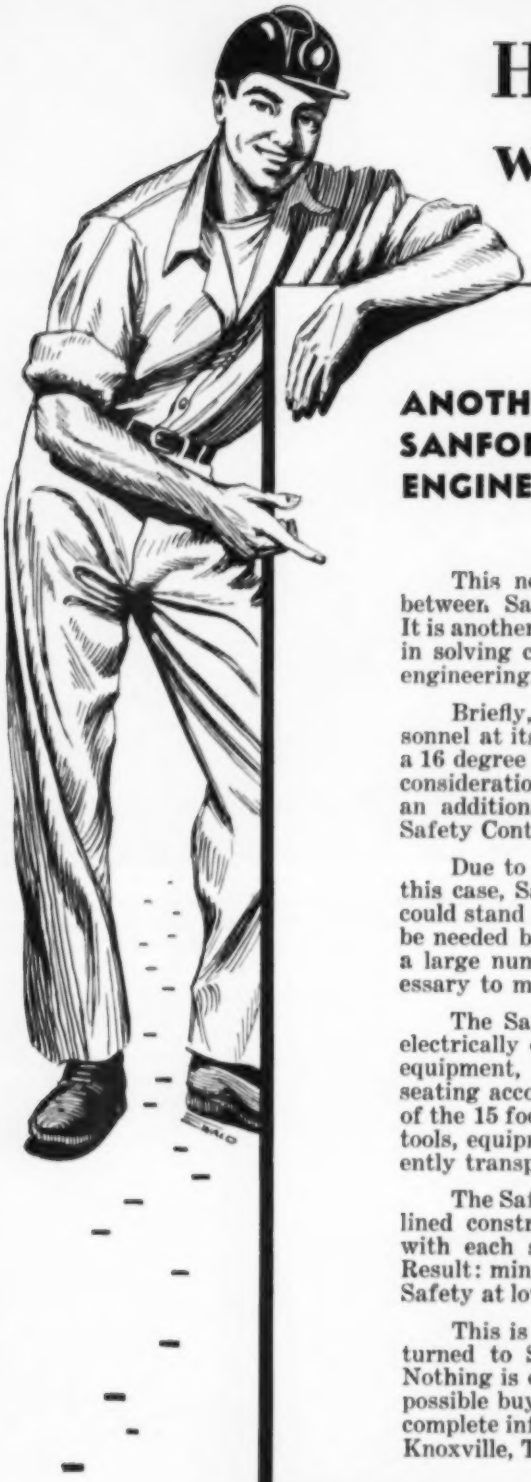
Whenever *you* have coal, rock, ore, or other shovel material to haul, it will pay you to check the output of fast rear-dump Tournarockers. Write for complete facts and figures on work like yours. We'll be glad to arrange a demonstration for you at your convenience.

R. G. LeTOURNEAU, INC.
Peoria, Illinois

Tournarocker is shovel-loaded with 11 yds. (15 tons) of well-blasted shale. About 10% of chunks are too big to clear 2-yd. bucket. Note restricted loading area. Rig's low, wide, open bowl makes easy shovel target . . . speeds loading, boosts daily output.

At fill, Operator Dayley Collett backs Tournarocker to edge of bank, flips fingertip "dump" button, drops load clean over bank. Reports Collett, "What I like most is the easy way these Tournarockers handle. They turn around with plenty of room to spare."

Tournarocker—Trademark Reg. U. S. Pat. Off. R-221-CM



Here's the Story on with Safety Control

ANOTHER GOOD EXAMPLE HOW SANFORD-DAY'S PRACTICAL CAR ENGINEERING CAN SAVE YOU MONEY

This new development is the result of close collaboration between Sanford-Day and Peabody Coal Company engineers. It is another example of Sanford-Day's ability and aggressiveness in solving coal operators' high cost problems with practical car engineering.

Briefly, in this case, Peabody needed cars to transport personnel at its No. 10 Mine. The cars were to operate by cable on a 16 degree slope. Safe transportation was the first and foremost consideration of Peabody officials. In order to achieve this end, an additional car incorporating all safety features, called the Safety Control Car, was designed.

Due to the relatively short haul and available head room in this case, Sanford-Day designed a man car in which personnel could stand rather than be seated. This meant fewer cars would be needed because this car accommodates from 36 to 45 men—a large number for this size car. Only two man cars were necessary to meet Peabody's transportation problem.

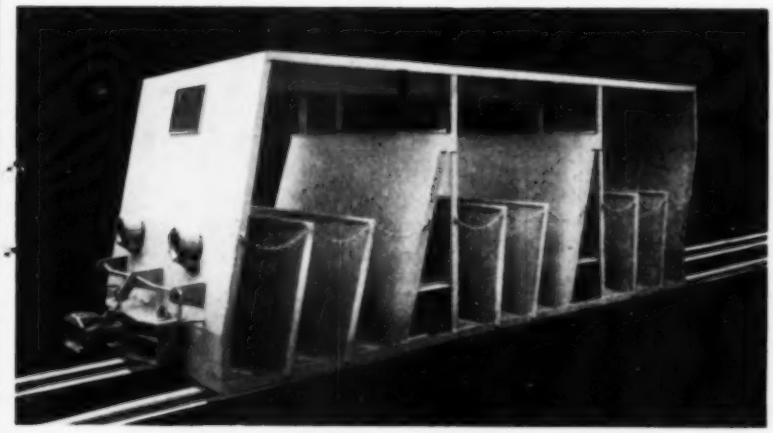
The Safety Control Car was developed with three pairs of electrically operated magnetic shoe brakes, batteries, generator equipment, governor and automatic switch control. There are seating accommodations for four men with the greater portion of the 15 foot long by 7 foot wide platform available for handling tools, equipment, supplies, etc. This car also operates independently transporting supplies and maintenance personnel.

The Safety Control Car and Man Cars have no costly streamlined construction. They are compact all-steel functional units with each steel member an integral part of the frame work. Result: minimum manufacturing cost which means you pay less. Safety at low cost has been the important factor.

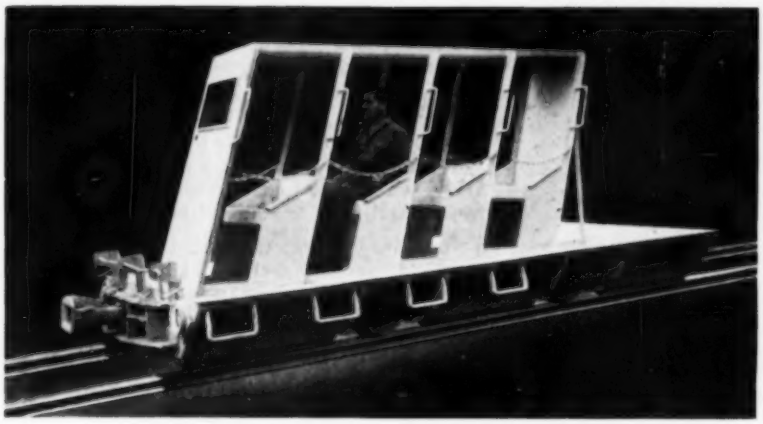
This is just one of hundreds of cases where an operator has turned to Sanford-Day for a practical solution to a problem. Nothing is overlooked to make Sanford-Day Man Cars your best possible buy for safe and efficient personnel transportation. For complete information, write to us today. Sanford-Day Iron Works, Knoxville, Tenn.

SANFORD-DAY IRON WORKS,

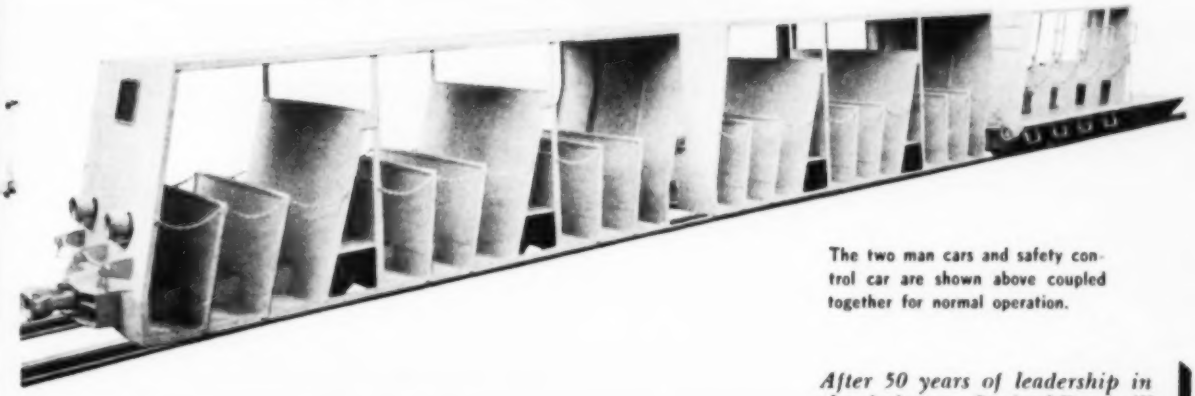
the New Sanford-Day Man Cars
Car Built for Peabody Coal Co.



This is the Sanford-Day Man Car built for Peabody Coal Co. It is 19 feet long by 7 feet wide by 6 feet 9 inches high. Car has safety chains, sealbeam headlights, safety glass window and silent rubber cushion type wheels. Passenger capacity 36 to 45 men.



This Sanford-Day Safety Control Car is 18 feet long by 7 feet wide by 6 feet high. Car has safety chains, sealbeam headlights, safety glass window, three pair of General Electric Shoe Brakes, automatically governor controlled and/or push button controlled, and silent rubber cushion type wheels. Passenger capacity four maintenance men. Supply capacity 75 square feet deck space.

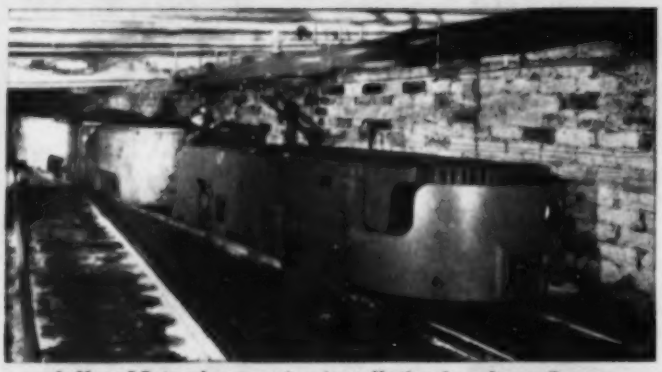


The two man cars and safety control car are shown above coupled together for normal operation.

After 50 years of leadership in the industry, Sanford-Day still devotes its entire capacity to the production of mine cars. Most improvements in mine cars originate with this company.

KNOXVILLE, TENN.

JEFFREY *Serves the* MINING INDUSTRY *from face to coal car*



Jeffrey 15-ton Locomotive installation in a large Pennsylvania mine.

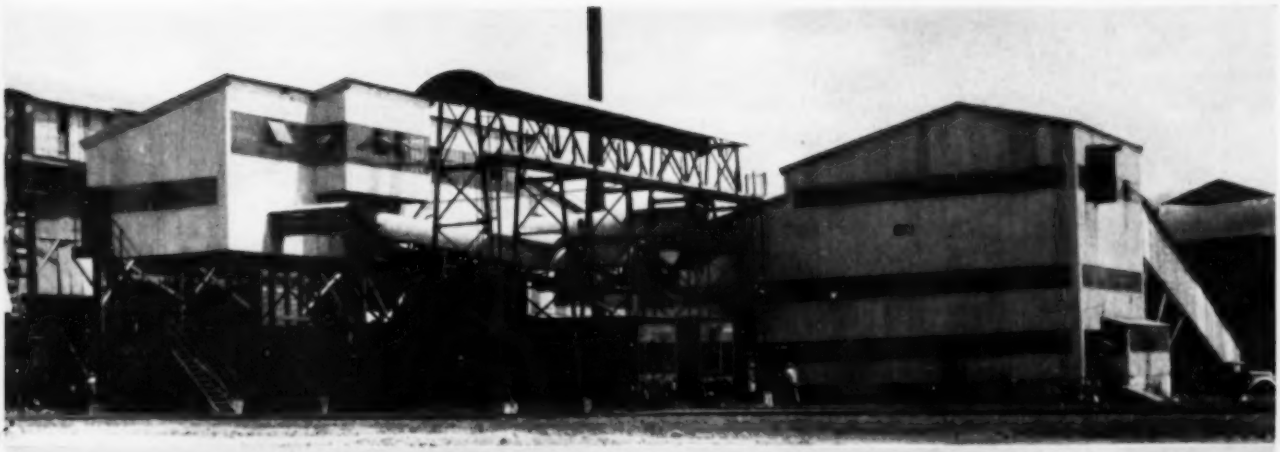
Jeffrey Room Conveyor discharging into an entry Belt Conveyor which transports the coal the entire length of the panel entry.

UNDERGROUND TRANSPORTATION

Since the time Mine Locomotives replaced the mine mule Jeffrey has designed, developed and built sturdy, powerful locomotives to help increase production and reduce costs.

Jeffrey Conveyors in chain and belt types are also being used extensively where that form of transportation best suits the operation.

Jeffrey Shuttle Cars also provide a modern, low-cost method of handling coal between loader and entry haulage system. Below is shown a Jeffrey Shuttle Car being loaded at the face by a loading machine.

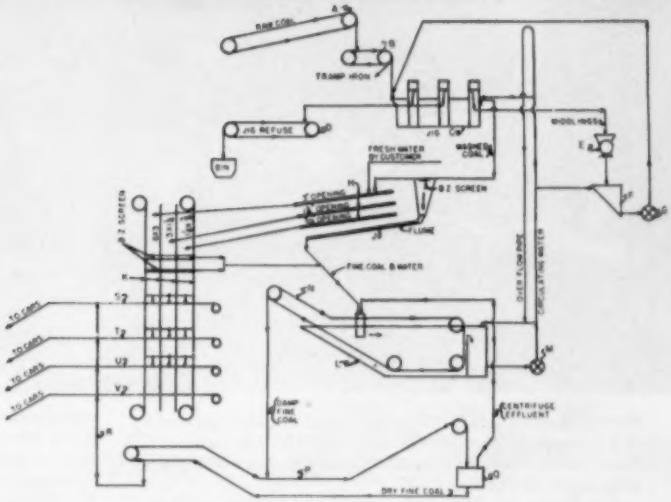


TOPGROUND PREPARATION

For years Jeffrey has been designing and erecting tipples as well as furnishing most of the equipment being used to prepare coal to meet exacting customer requirements.

The tipple illustrated above is typical and was designed, built and equipped by Jeffrey. The flow chart at the right shows the location of Jeffrey equipment in the plant and chronological sequence of operation.

Jeffrey also makes individual units such as Washers, Crushers, Feeders, Screens, Picking Tables, Loading Booms, and Conveyors to extend or modernize existing plants.



FLOW DIAGRAM

KEY TO EQUIPMENT

A—Belt Conveyor Feed to Magnetic Separator
C—Jig
D—Jig Refuse Conveyor
E—Crusher
F—Middlings Sump
G—Middlings Pump
H—Dewatering Screen
J—Flumes to Settling Tank
K—Mixing Conveyor
L—Settling Tank
M—Pump and Piping
N—Settling Tank Conveyor
P—Fine Slack Conveyor
R—Slack Conveyor
S—Loading Boom—Egg
T—Loading Boom—Junior Egg
U—Loading Boom—Stoker
V—Loading Boom—Slack

THE JEFFREY MANUFACTURING COMPANY

North Fourth St., Columbus 16, Ohio

Material Handling, Processing and Mining Equipment

Baltimore 2 · Boston 16 · Cincinnati 2 · Detroit 13 · Houston 2 · New York 7 · St. Louis 1
Beckley, W. Va. · Buffalo 2 · Cleveland 15 · Forty Fort, Pa. · Jacksonville 2 · Philadelphia 3 · Salt Lake City 1
Birmingham 3 · Chicago 1 · Denver 2 · Harlan, Ky. · Milwaukee 2 · Pittsburgh 22

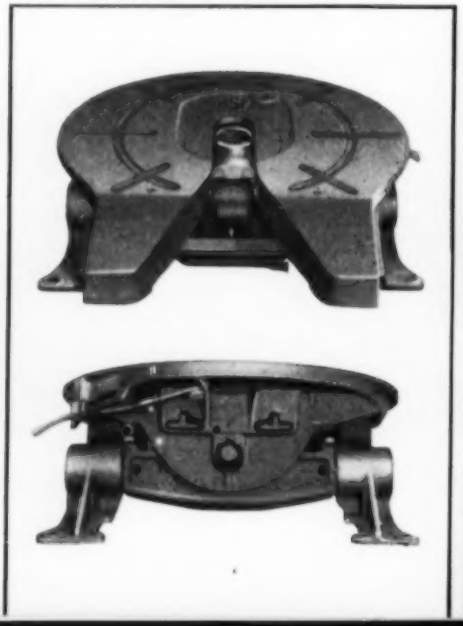
Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio

Marion shovel, loading a 34-ton coal payload into one of 23 Austin-Western trailers powered by Dart tractors. Scene is at Midland Electric Coal Corporation's strip mine near Farmington, Ill.

ASF Safety 5th Wheels have to be tough to stand up in this heavy-duty service, especially during wet weather when tractors are needed at each end of the semi to get it out of soft ground. Because ASF 5th Wheels are so easy to uncouple, in effect Midland has a *flexible pool* of load-carrying equipment and motive power, rather than 23 separate units. The result is fuller, more efficient use of available equipment.

Back and turn on a dime—In addition to quick interchange between motive power and load-carrying equipment, the tractor-trailer is highly maneuverable. ASF 5th Wheels are side-oscillating: even a full load can be safely and easily jack-nifed for a short turning radius.

Heart of the semi—the ASF 5th Wheel—36" extra-heavy-duty ASF Safety 5th Wheel made for the rugged service and heavy loads found in off-highway work. Note the heavily reinforced plate; the massive "I" section center beam; the extra-strong mounting brackets.



He speaks through firsthand experience—M. R. Heckard, Superintendent of Equipment, has used ASF Safety 5th Wheels on all semi's for 11 years. He particularly likes the comparatively new 36" wheel shown at left; feels it will cut maintenance costs to a new low.

The Midland Electric Coal Corporation proves that your best investment for efficient tractor-trailer operation is an ASF Safety 5th Wheel . . .

"Best of all—they're easy to uncouple"

Ease of uncoupling is one of the big reasons why ASF Safety 5th Wheels are standard equipment on the fleet of semi's at Midland Electric Coal Corporation's strip mine near Farmington, Ill. M. R. "Marty" Heckard, Superintendent of Equipment, says:

"We use ASF 5th Wheels on all our semi's, and each wheel takes a real beating during the loading and hauling of a 34-ton payload around 30 times a day.

"One of the main reasons why we like these 5th Wheels is because they are easy to keep free of slack. We just add a shim usually once a year.

"Best of all, however, they are easy to uncouple in a matter of minutes. We can easily shop the tractor for maintenance without the trailer, or vice versa. Working on one at a time makes servicing easier, and we avoid tying up the whole semi."

Quick interchange between motive power and load-carrying equipment is a real asset in mining and quarry work. And there's no denying that you get it with a tractor-trailer. But a 5th wheel—or any hitching device—tends to defeat its purpose if it's hard to uncouple.

Easy uncoupling can save you time, trouble and expense, as it has in this modern strip mine operation. But, it's equally important to know that the ASF Wheel *only uncouples when you want it to uncouple.* This is no beefed-up highway wheel. It's made specially for heavy-duty off-highway service, from the "I" section center beam to the side-oscillating plate that absorbs the sidestrain of uneven roadway. Until a twist of the wrist releases the king-pin, it's built to *stay* coupled—come shocks, strains or high water!

Get the facts on the best 5th wheel investment you can make! See your nearest ASF Distributor, or write: American Steel Foundries, Automotive Division, 410 N. Michigan Avenue, Chicago 11, Ill.

remember this . . . about ASF safety 5th wheels

Largest king-pin bearing area of any 5th wheel . . . Stresses absorbed by a larger bearing area—larger than any other 5th wheel—means longer life for king-pin and jaws.

Shorter king-pin bending leverage . . . Jaws grip the king-pin at the top. The pin *stays straight*—and can't "spring" or disengage.

Side oscillation protects equipment . . . 1½° of free oscillation—plus 5½° controlled by rubber stabilizers—absorbs sidestrain of uneven roadway.

Heavy, cast alloy-steel construction . . . Plate is hinged on strong, rigid "I" beam with big 2" pin. Extra large contact area between plate and beam doubles rocker life. Both rocker and cast-steel bracket are bronze-bushed to cut wear to a minimum.

Easy to maintain in perfect operating condition . . . Wear is inevitable, but on ASF Wheels, it's easily counteracted simply by inserting one or more low-cost shims between buffer and housing front wall. Result? Like-new service, without expensive rebuilding!

A quick glance tells you the lock is LOCKED . . .

LOCKED—as quickly shown by the lever position. The easy-to-see lever can only be in this position when the jaw' are truly locked.

UNLOCKING—with an easy twist of the wrist. Simply move the safety dog up, and pull the lever forward.

UNLOCKED—and ready for coupling. The lever moves back to locked position only when the jaws are locked!

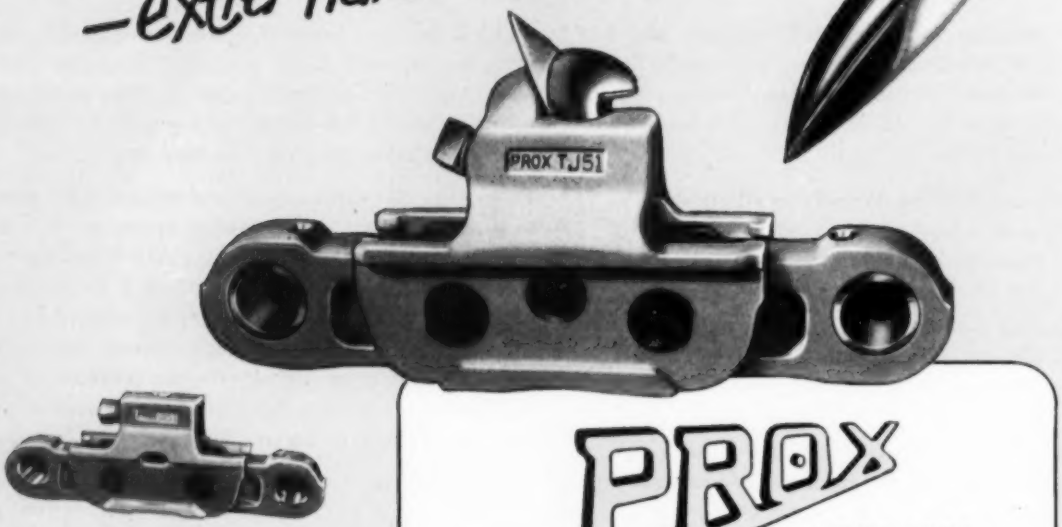
A 3,000-pound "compression-grip" saves your maintenance dollars . . .

COUPLING—as the king-pin enters the jaws, the jaws are forced back against the exclusive ASF rubber buffer block, building up compression.

COMPRESSING—3000 pounds are built up before the lock clears the rear jaw, allowing lock to snap to locked position.

LOCKED—and the jaws *remain* under compression. The grip is like a vise; eliminates the slack and backlash that can cost you money in added 5th wheel and king-pin wear.

Get extra-long-life —extra hard-cutting time!

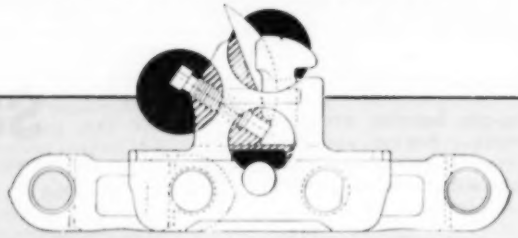


PROX

SINCE 1875

COAL CUTTING EQUIPMENT

- DUOMATIC CUTTER CHAINS
- TOOL STEEL BITS
- CUTTER BARS



New Prox Coal Cutting Equipment has already proved itself to be the answer to higher production at lower per-ton costs. The Prox Duomatic Cutter Chain is designed to assure long-lasting dependability. The exclusive, circular-back drop forged tool steel bit is one of the strongest available. And the new Prox Cutter Bars are, by far, America's sturdiest.

FRANK PROX COMPANY, INC. • TERRE HAUTE, INDIANA

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CHARLESTON ELECTRICAL SUPPLY CO., Charleston, West Virginia
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MINE SUPPLY CO., 402 So. Main St., Carlsbad, N. M.
FRANK MEMMOTT, Box 154, Castle Gate, Utah
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JOY SAL-37T
TELESCOPIC FEED—LONG STEEL CHANGES—LIGHTWEIGHT LOW AIR CONSUMPTION

JOY SAE-91T
TELESCOPIC FEED—LONG STEEL CHANGES—SHORT OVERALL LENGTH—HEAVY DUTY

THESE ROOF-BOLTING STOPERS GET THE JOB DONE FASTER and CHEAPER

You can cut your roof-bolting costs away down with Joy Stopers . . . with constant-pressure telescopic feed and centralized control.

In the first place, the long steel changes that Joy Drills afford mean *fewer* steel changes for your roof-bolters and more time spent in actually drilling . . . *more hole footage per shift.* What's more, fewer steel sizes need be carried in stock and hauled to the face.

In the second place, Joy Stopers have several exclusive features: such as *cadmium-plating* inside and out for rust-protection, closer tolerances and easier run-ins . . . and the famous *Dual Valve* that "makes air do more work". These features make for greater efficiency, longer service life and less maintenance.

Joy builds a complete line of roof-bolting equipment—air-operated or hydraulic. ● *Call on us for details . . . Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

SPECIFICATIONS

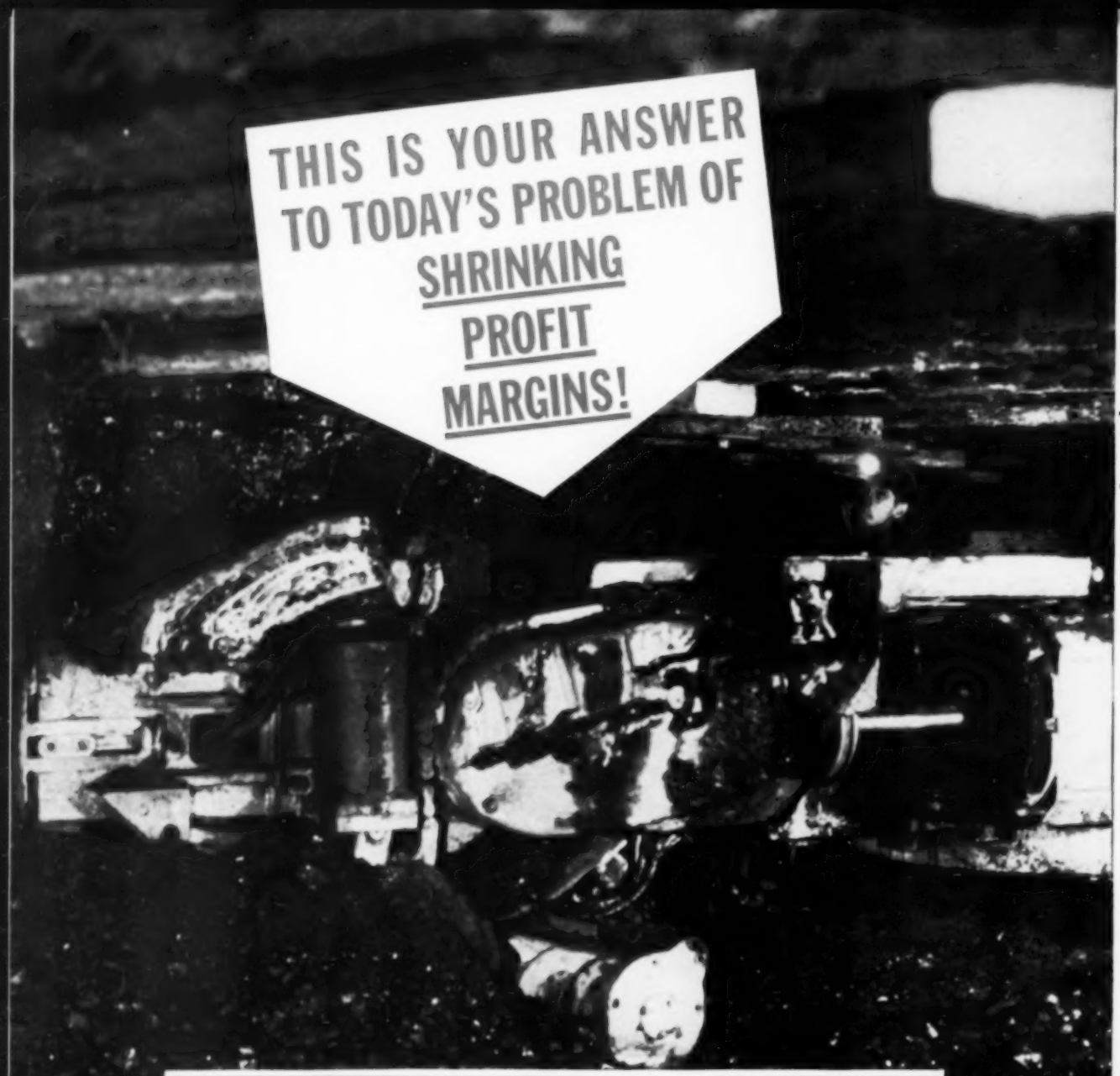
	SAL-37T			SAE-91T			
Steel Changes	30"	36"	42"	30"	36"	42"	48"
Weight	63#	65#	67#	98#	103#	106#	109#
Collapsed Length	25"	28"	31"	23¼"	29⅝"	32⅝"	35⅝"
Extended Length	61"	70"	79"	57½"	73⅛"	82⅛"	91⅛"

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

W&U CL-4301



HERE'S A TYPICAL MONTH'S PERFORMANCE OF THE JOY CONTINUOUS MINER PICTURED ABOVE

	Day Shift	Night Shift
Number of Working Days	22	22
Length of Shifts: Hours	7:00	7:00
Average Machine Operating Time: Hours	4:38	5:07
Average Feet Advanced per Day	105	122.7
Average Production: Tons per Man Day	42.4	50.3
Average Cost per Ton (Labor: 7-man Crew)	$.37	$.32

This machine is a 3JCM Continuous Miner, the Joy low-vein Model. It is working in 55″ coal which has a 2″ parting in the middle of the seam. The machine is charged with a 7-man crew on each shift, which includes the operators of all mechanical equipment, as well as a boom man who shifts cars under the belt conveyor, and a roof-bolting man.

In thin seams
or in
thick seams

The JOY
CONTINUOUS
MINER

marks a new era
of Efficiency
and Low Cost
in coal mining

Consult a Joy Engineer

WBD CL 3339

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Nothing on the Market Matches

JOY SULMET CUTTER BITS

WHEN IT COMES TO CONQUERING TOUGH SEAM CONDITIONS

JOY Sulmet Tungsten Carbide Cutter Bits can cut faster and at less cost per ton of coal than any other bit on the market—*facts proved by actual operating records from many different mining areas and under widely varying seam conditions.* An exclusive Joy feature—the use of a protective cap over the tungsten carbide insert—reduces bit breakage and practically ends insert loss. Sulmet Bits are available in eight cutter styles, including a design for the Bowdil ML Chain, plus auger and finger bits for Coal Drills. ● *Let us show you what they can do for you.*

See the Joy Film: "Sulmet Tungsten Carbide Bits" 16 mm · Sound · Full Color · 40 Minutes
Write our Film Booking Office for free showing

AGAIN SULMET BITS PROVE SUPERIOR

THE PROBLEM: A Western Pennsylvania mine has sulphur streaks, 1" to 6" thick, running throughout the seam. Hard clay veins occasionally obliterate the coal for two or three cuts. Both an undercut and shear cut were used, and shearing through these impurities caused so much wear that cutting time per shift was greatly reduced by frequent bit changing.

THE SOLUTION: A test run was made on their Universal machine with 125 Sulmet SMB Bits (see above). After four weeks of operation, three shifts a day, the test was considered complete, although 89 bits still had a life expectancy of two or three weeks. Even if all were considered worn out, bit cost would be only $.026 per ton of coal. Also, cutting speed had increased tremendously since all bit-changing could be handled between shifts.

Consult a Joy Engineer

WSD CL 3994

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Superintendent, Emily Mine, Warner Collieries, reports:

Extra strength plus minimum stretch has kept this "Cordura" rayon-reinforced slope belt in trouble-free operation for some three years. It is 2250′ between centers and runs at a speed of 390′ per minute.

Triple belt pictured here is also "Cordura" reinforced. It is a Goodyear "Coalflo" type. Over 34% slope, it carries 250 tons per hour. A 50-horsepower motor drives the belt a a speed of 245 feet per minute.

Belt reinforced with "Cordura" rayon cost no shutdown time in 3 years

In three years of operation at the Emily Mine of Warner Collieries, Mammoth, W. Va., this 30″ slope belt has virtually eliminated lost time due to shutdowns, according to Paul Smith, mine superintendent. It was manufactured by Goodyear Tire and Rubber Company on a 6-ply carcass of Du Pont Cordura* High Tenacity Rayon.

Rough slate as well as coal is hauled by the belts in this mine, and the cross-belt drops are unusually high. Warner's engineers choose belting reinforced with "Cordura" yarn because of its great strength, which provides resistance to heavy shocks, and because of its minimum stretch and easy troughing.

Here's why "Cordura"-reinforced belts offer these proven advantages. Man-made "Cordura" yarn is inherently stronger than natural fiber yarn. This permits manufacturers to make a belt thinner . . . with fewer plies . . . yet stronger. These thin belts are naturally more flexible, trough better, have less tendency to crack and separate.

Find out about conveyor belts made with "Cordura" yarn. We'll be glad to send you the names of suppliers . . . also give you full information about "Cordura" in the booklet "Sinews for Industry." Write for your FREE copy to: Textile Fibers Dept., Room 2504-C-2, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Holes loaded and ready to shoot.

Peak of blast. Confinement is good.

Spent gases appear—air blast avoided.

Well placed final pile. Throw controlled.

the inside story

Here's how ROCKMASTER® blasting helps control throw

THIS blast area on By-pass Route 22, Easton, Pa., was adjacent to gasoline storage tanks, homes, a parking lot, business establishments and a precision instrument factory. It was a ticklish blasting problem for Central Pennsylvania Quarry, Stripping and Construction Co., contractors on the job. Absolute control was a "must." Flying rocks had to be minimized . . . along with noise and vibration.

The ROCKMASTER pattern illustrated above was designed to keep blasted material from falling down the slope. The holes were carefully loaded and adequately stemmed. As the blast was fired, it advanced in alternate delay periods from ROCKMASTER No. 1 to No. 6. The row toward the slope fired first and gave relief for subsequent rows. The general heave inclined toward this relief—up the slope.

When you have shooting problems like this, ROCKMASTER can help you too. Send for your copy of the ROCKMASTER Blasting System Booklet.

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

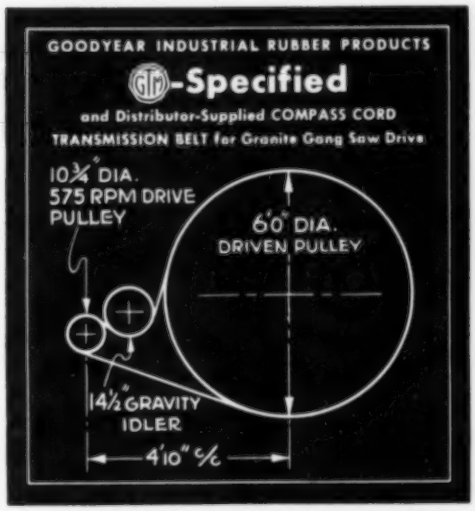
DOUBLED BELT LIFE

by consulting Goodyear Distributor

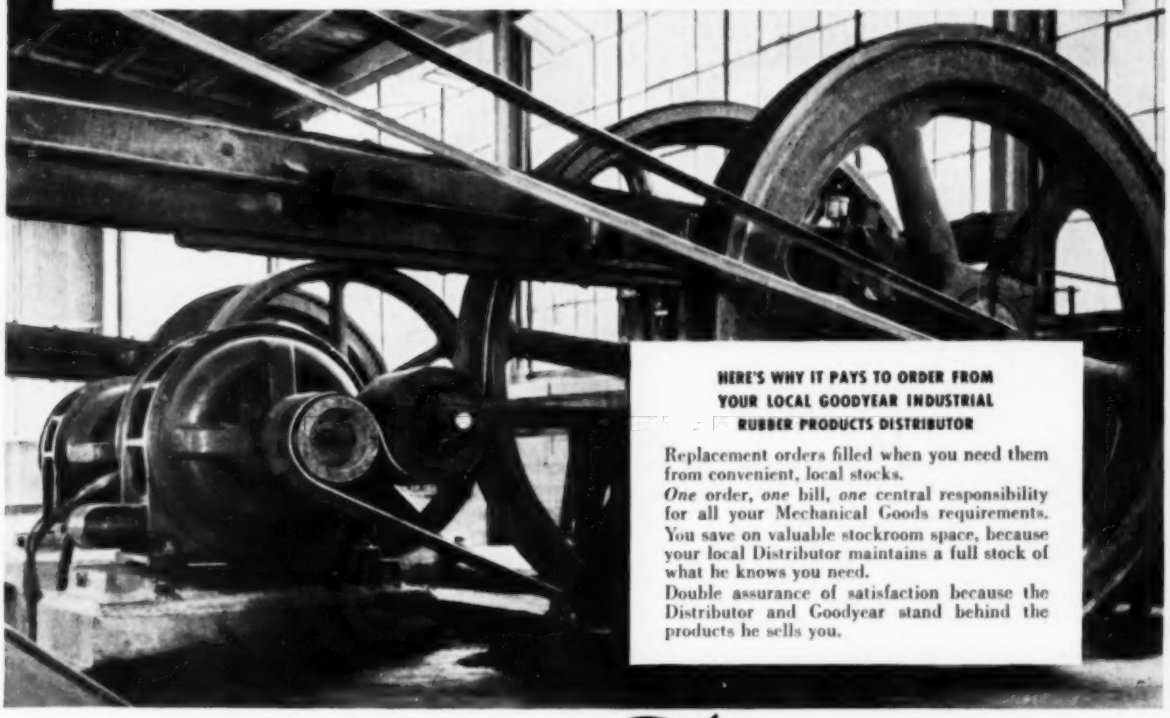
OPERATOR of this granite gang saw called a Goodyear Distributor for help with his flat belt drive. The Distributor came, bringing along the G.T.M.—Goodyear Technical Man—to analyze the drive and make belt recommendations.

The G.T.M. studied the drive, made his engineering recommendations, specified the belts to handle the problem. Result: the COMPASS Flat Belts he recommended delivered two years' service—*double the best previous record*. The Distributor took over—now stocks the exact replacement belts the operator needs—can deliver them right out of stock at any time.

You can get service like this, too—specification of the *right* product and on-call delivery—simply by calling your nearest Goodyear Industrial Rubber Products Distributor. Look for him in the yellow pages of your Telephone Directory—handling Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls—or write for an introduction to Goodyear, Mechanical Goods Division, Akron 16, Ohio.



Compass—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



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Replacement orders filled when you need them from convenient, local stocks.

One order, *one* bill, *one* central responsibility for all your Mechanical Goods requirements.

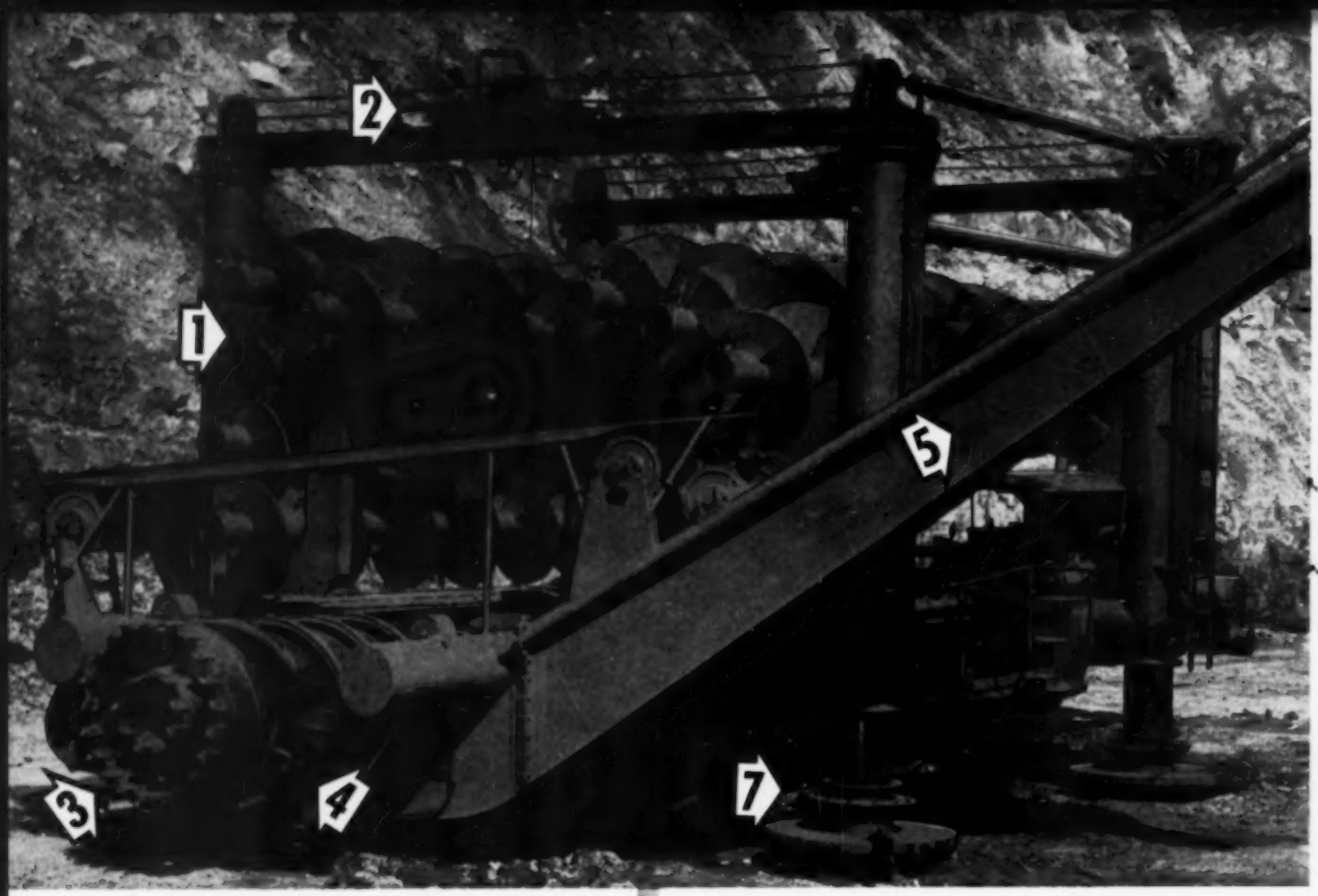
You save on valuable stockroom space, because your local Distributor maintains a full stock of what he knows you need.

Double assurance of satisfaction because the Distributor and Goodyear stand behind the products he sells you.

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network



More Coal

regardless of overburden...

Recovers up to 700 tons per shift where overburden removal is too costly

COMPTON

When normal strip mining reaches an economical limit--where overburden removal is prohibitive--the Compton Auger paves the way to rapid high wall coal recovery at minimum cost. With proper planning, a practical 70% recovery is possible up to a depth of 200 feet from the high wall face.

Easily operated and low in maintenance cost, the Compton Auger is high in output . . . actual operations have proven up to 700 tons of clean, lumpy coal per normal shift with a maximum crew of 4 men.

The Compton Auger means increased production at lower cost . . . higher product quality through selective mining. Plan today to profitably extend your present operations or future developments with the use of Compton Augers.

DESIGNED TO CUT OPERATION TIME!

The Compton Coal Auger is self-contained . . . no extra parts to be moved . . . no loose parts to be handled when the unit is ready to move and begin operation.

1. Auger sections conveniently racked at each side of the frame ready for transfer to operating position.
2. Hydraulically controlled, synchronized winches for handling auger sections.
3. Auger section can be placed in operating position in a matter of seconds.
4. Hydraulically operated pilot pan eliminates spillage between the machine and high wall.
5. Compton elevating conveyor is an integral part of the machine.
6. Hydraulically controlled, swivelling discharge turret chute assures uniform trimming of trucks.
7. Hydraulic jack legs with self-leveling pontoons that afford better floatation and allow drilling up to 200 ft. or more in depth without misalignment.

SPECIFICATIONS

Model 42

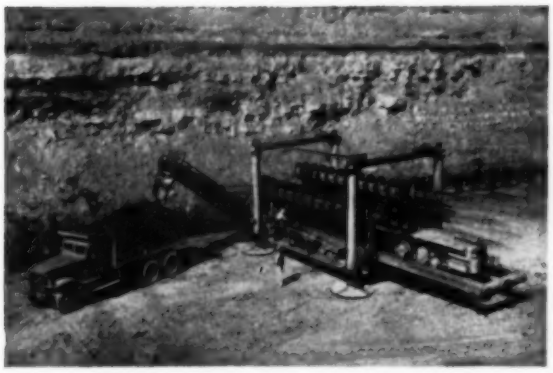
Length: 42 ft. Weight: Approx. 33 T.
Carries nine 21 ft. auger sections.
Required pit width: 45 ft. minimum.
Power: 225 hp Diesel engine.
Hydraulic frame jack lift: 66 inches.
Auger Diameters: 48 inch to 30 inch.
Possible drilling depth: 189 ft.

Model 56

Length: 56 ft. Weight: Approx. 50 T.
Carries six 34 ft. auger sections.
Required pit width: 60 ft. minimum.
Power: 300 hp Diesel engine.
Hydraulic frame jacklift: 66 inches.
Auger Diameters: 52 inch to 30 inch.
Possible drilling depth: 204 ft.

Hydraulic frame jack lift permits drilling of single holes or overlapping holes.

Self Contained Coal Auger



In actual operation, the location of hydraulically-operated turret chute provides two-way loading approach for trucks. Truck maneuvering time is minimized . . . trucks are trimmed to full load without spillage.

NOW—Latest Development in Auger Cutting Heads—A non-clogging head with built-in spider bearing assembly! This new cutter head increases production by drilling straighter holes with less frictional drag.

Consult a Compton Engineer for Details

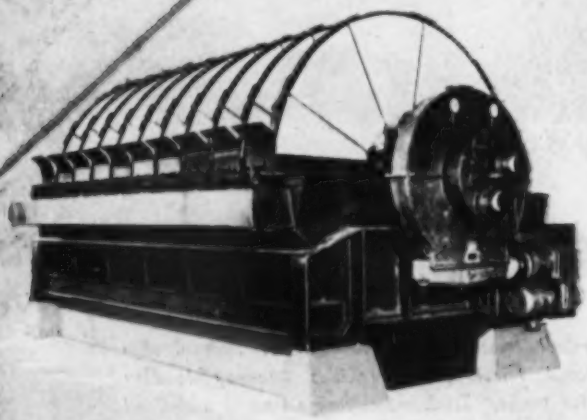
Compton, Inc.

ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

BOX 1946 — PHONE 4-6384 CLARKSBURG, WEST VIRGINIA

Laboratory Test Unit available to plants wishing to test the filterability of fine coals.

RECOVER COAL FINES WITH EIMCO AGIDISC



Above: 10'8" diam. x 10 disc Eimco Agidisc filter.

Eimco Agidisc filters are heavy-duty, dependable machines built for continuous 24 hour operation in dewatering fine coal. These filters will:

1. Reduce moisture content in the fine coal to 15% or better, depending on the other plant equipment.

2. Produce a clear filtrate which contains less than the allowable ppm solids permitted under existing anti-pollution laws.

3. Permit uniform cake distribution over the entire surface of the disc with a resultant even drying of the fine coal filter cake.

4. Produces greater tonnage of dewatered coal per square foot of filter surface.

5. Save a product that has been considered too expensive to process—providing additional profits per ton of coal washed.

6. Pay for itself in a very few months.

Eimco Agidisc filters are doing an outstanding job in many coal washing plants and coal pond reclamation projects. Arrangements can be made to put a test unit in your plant. If you are interested please write.

EIMCO

A426

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment

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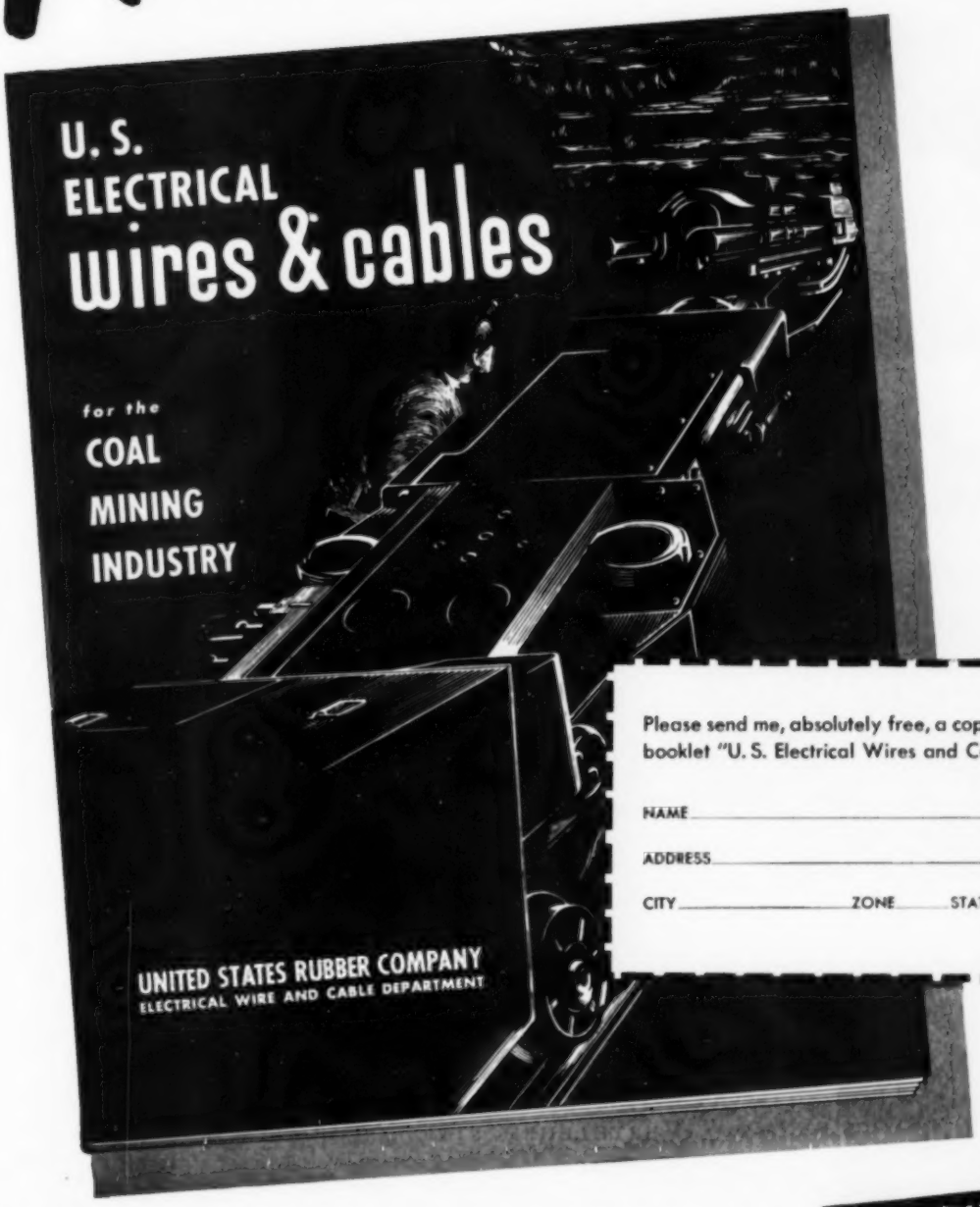
FREE!

THIS VALUABLE BOOKLET FOR THE COAL MINING INDUSTRY INCLUDES

Description of the most complete line of wires and cables for the Coal Mining Industry.

It's A Guide To

- ★ selecting the correct wire and cable
- ★ to splicing and patching
- ★ other essential information



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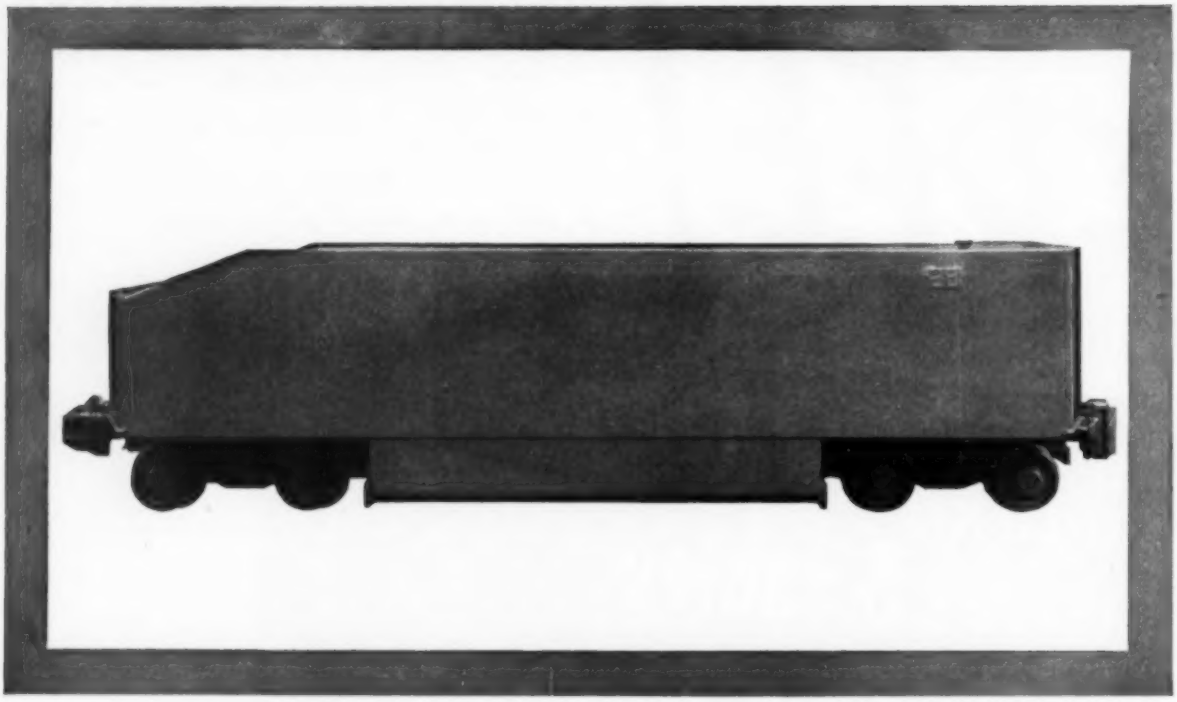
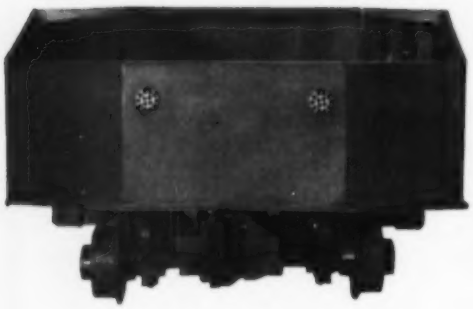
SERVING THROUGH SCIENCE



Another Great Car by Bethlehem



Here's a big mine car that we recently built in quantity for one of our good customers. He had thought out his car problem carefully and had pretty well decided what he wanted. To his ideas we added several suggestions of our own. Result: a fine 10-ton job that exactly meets the customer's needs.

It has cast-steel, high-speed trucks with the springing arranged for extra-smooth travel. It has automatic couplers, eight forged wheels, and all-steel, all-welded body. It's designed for rotary-dump unloading.

This of course is but one of the many eight-wheel mine cars that Bethlehem builds. We make four-wheelers, too, for the kind of operation that requires a short wheelbase. Practically any size or type of car you want can be furnished as specified.

Call or write us the next time you're in the market. Our engineers will gladly help you plan and design your cars. Our shops will follow through with the finished product.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

Loader 24"-high gets bigger lumps from slim seams

...with help of TIMKEN® bearings

THIS 20 BU loader made by the Joy Manufacturing Company works a seam only 30 inches high. Unique features of the 20 BU loader include a gathering head with an exceptionally rugged bevel gear drive; and a conveyor pan only 18 inches above the floor which permits the passage of larger, more profitable lumps back to the shuttle car. Production capacity is 5 to 8 tons per minute.

The gathering head on the Joy 20 BU loader is equipped with 24 Timken® bearings. There are 16 other Timken bearings throughout the loader at other vital spots. Smooth, trouble-free operation is assured, even under the severest conditions.

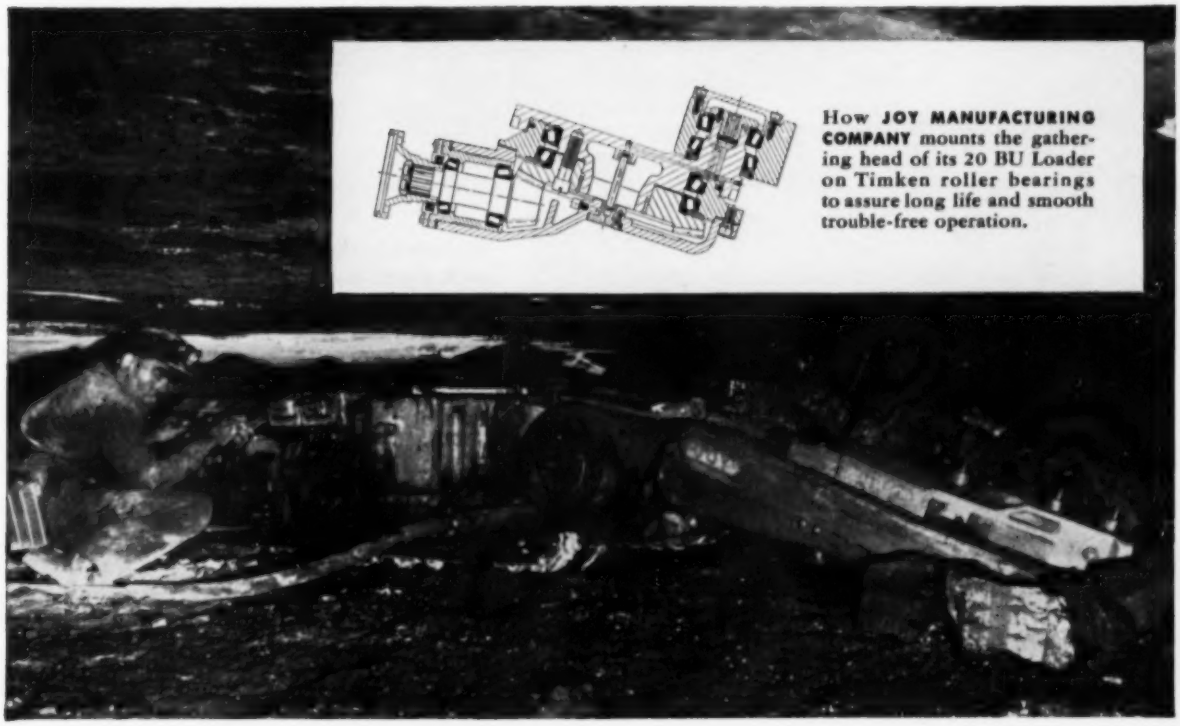
Line contact between rollers and races gives Timken bearings extra load-carrying capacity. Their tapered construction lets them carry both radial and thrust loads in any combination. True rolling motion and extremely smooth surface finish of rollers and races make friction negligible.

Because Timken bearings keep housings and shafts concentric, closures are more effective. Dirt and coal dust are kept out; lubricant is kept in. Lower maintenance and lubrication costs result.

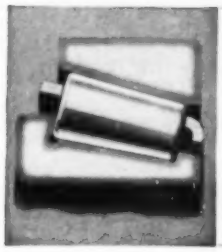
Timken bearings are case-carburized—have hard, wear-resistant surfaces and tough, shock-resistant cores. Normally, they'll last the life of the machine.

No other bearings can give you all the advantages of Timken bearings. Look for them in the machines you buy. Specify them for the machines you build. Always look for the trademark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **JOY MANUFACTURING COMPANY** mounts the gathering head of its 20 BU Loader on Timken roller bearings to assure long life and smooth trouble-free operation.



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL AND THRUST ▭ LOADS OR ANY COMBINATION

PARMANCO HI-SPEED HORIZONTAL DRILL

Completely Re-designed Around a 40 H.P. Engine

Drills a 6-inch Hole in two-thirds the ordinary time

Included in the new design is an auger rack which saves on drilling time. The augers are on the machine as it is moved from hole to hole. Another feature, for faster set up and smoother drilling, is the four individually adjustable leveling jacks. Automotive steering is optional.

This HI-SPEED DRILL is designed for drilling 5-6-8 in. holes to 100 ft. or more. The 40 h.p. engine with four drilling speeds makes possible the reduction of footage time by one third. This new drill, the very latest in design, is equipped with self starter and generator, dual type front wheels, truck type rear axle with hydraulic brakes and traction drive with both forward and reverse. Here is greater speed in retrieving augers and four rotating speeds and reverse for drilling and cleaning the hole. Here is accuracy and mobility. Here is the modern answer to faster, lower-cost drilling.

PARIS MANUFACTURING CO. PARIS ILLINOIS

years ahead!

P&H

Here's progress far ahead of old fashioned designs — progress that pays off in steadier production . . . lower tonnage costs! For example —

P&H stepless power regulation gives you smoother, more accurate control . . . completely eliminates the complex make-and-break contactors which cause trouble. Furthermore, P&H Magnetorque* Hoist Drive powers hoisting motions electro-magnetically — gives you faster dipper action . . . freedom from maintenance worries.

But P&H progress doesn't stop with electrical advancements. Here's the ruggedness of welded alloy steels — backbone for a lifetime of service. But let us direct you to a P&H in action — see *all* the modern refinements that make P&H the top producer in the open pit.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

Every third P&H Electric Shovel sold is a repeat order

P&H LARGE EXCAVATOR DIVISION

HARNISCHFEGER

CORPORATION

4400 W. NATIONAL AVENUE • MILWAUKEE 46, WISCONSIN

the **P&H** *Line*

"DOUBLED PREVIOUS YARDAGE RECORD"...

When He Switched to

Tuffy® Draglines

says Mine Operator in the Illinois Fields

Tuffy SCRAPER ROPE

Extra Yardage Cuts Rope Costs

A special rope, designed by wire rope specialists to stand up longer under drum crushing abuse, sharper bends over sheaves, angle pulls through swivel sheaves, other scraper rope abuses. Test its extra yardage handling ability! You'll want to change over completely when you see how much Tuffy Scraper Rope can help you save!

Tuffy DOZER ROPE

Users Report Up To 300% Increased Service

Now, there's no need to throw away 40' to 50' of good rope when 10' is crushed! Not when you're using Tuffy, the dozer rope specially constructed for dozer service. Tuffy has the stamina to go on handling the dozer blade. It is supplied on 150' reels for mounting on the tractor just back of the wedge block. Then you just cut off the 10 or 12 feet that may become damaged after long, hard service on the drum, feed in enough off the reel to replace it in half the time it would take for full replacement. Users report up to 300% increases in rope service. Write today for full information.

union
Wire Rope
corporation

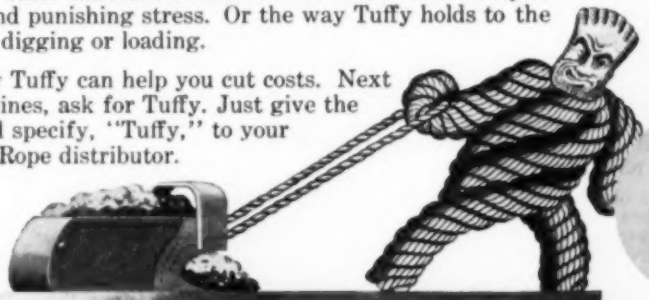
Specialists in Wire Rope
and Braided Wire Fabric

EXTRA FLEXIBILITY of Tuffy Proves Major Factor in Dragline Savings

"The last two Union Tuffy Drags went 721,000 cu. yds. and 555,000 cu. yds. respectively. The best of previous ropes are 300,000 or less. So you can see why we are so enthusiastic about Tuffy." (name on request)

Think of it! Savings up to 50% and 60% on dragline costs! And this is the usual—not the exceptional—report to our fieldmen from mine operators who have switched to Tuffy Draglines. The reason for such savings? Many attribute it to Tuffy's extra flexibility and special construction that allows bending in any direction without damage. Others claim it's Tuffy's greater inherent resistance to wear – the ability to withstand jerking and punishing stress. Or the way Tuffy holds to the drum when casting, digging or loading.

See for yourself how Tuffy can help you cut costs. Next time you order draglines, ask for Tuffy. Just give the length, diameter and specify, "Tuffy," to your nearest Union Wire Rope distributor.



Other Specially Designed Tuffy's For Special Uses

Tuffy SLINGS

9 part machine-braided wire fabric construction fights off knots and kinks, stands up longer than ordinary wire rope. Proof-tested to twice safe working load.

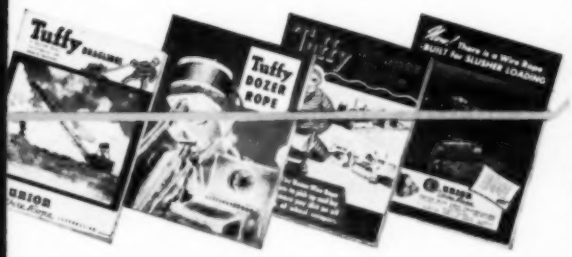
Tuffy MINING ROPE

Crab Motor Ropes, Winch Ropes to fit your needs—all Union-formed (Pre-formed) and designed to give maximum safety and service—at ultimate low cost.

Tuffy SLUSHER ROPE

Improved 3 x 19 gives maximum resistance to abrasion . . . is rigid, non-collapsing to eliminate drum crushing, yet elastic and flexible enough to take up shock loads.

SEND FOR THESE FREE FOLDERS



union Wire Rope corporation

Specialists In Wire Rope and Braided Wire Fabric

2130 Manchester Ave., Kansas City 3, Mo.

Please send me illustrated folder on:

- ☐ Tuffy Dragline
- ☐ Tuffy Scraper Rope
- ☐ Tuffy Slings
- ☐ Tuffy Dozer Rope
- ☐ Tuffy Slusher Rope

Firm Name_____

By_____ Title_____

Address_____ City_____ State_____

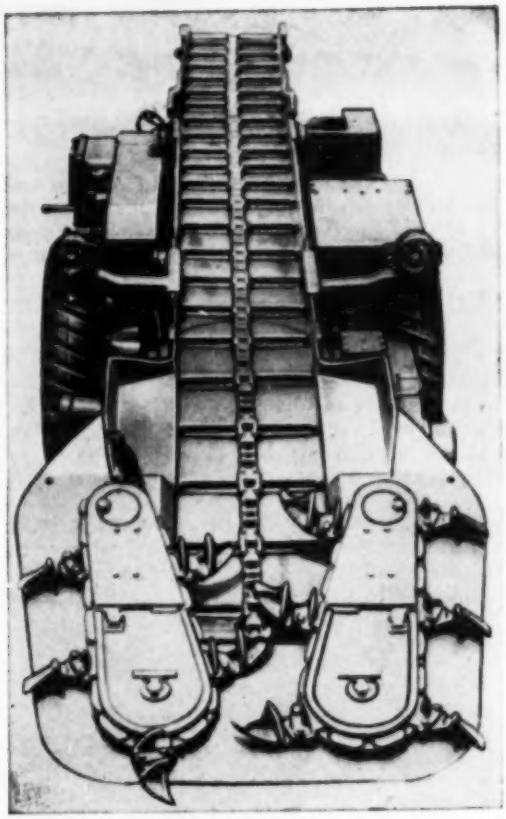
"VERY MUCH IN FAVOR OF"

MARVEL SYNCLINAL FILTERS

Says: John L. Clarkson, President
The Clarkson Manufacturing Co., Nashville, Illinois

"In coal mining the coal dust settles on and around all parts, connections, and fill plugs. When the plugs for fill pipes are removed, invariably small particles of coal dust drop into the tank. When hose connections are connected in the mine, dust coal particles also get into the line. The filter catches this dust on its first trip around and prevents damage to the pump and cylinders. We are very much in favor of your filters."

John L. Clarkson



CLARKSON UNDERGROUND LOADING MACHINE

This machine, widely used in the coal mines, has its vital hydraulic power system protected by the Marvel Synclinal Filter. Like over 300 other manufacturers, The Clarkson Manufacturing Company installs Marvel Synclinal Filters as original equipment.

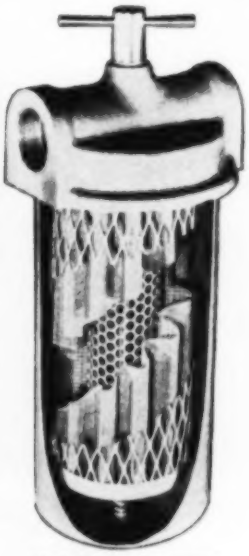
INCREASE PRODUCTION REDUCE MAINTENANCE COST

Protect Hydraulic Equipment with Marvel Synclinal Filters

More and more manufacturers and users of hydraulic machines and other equipment with low pressure, hydraulic oils, coolants, lubricants and water systems are depending on Marvel Synclinal Filters to protect their machines' efficiency. Marvel Synclinal Filters are speeding production in a wide range of industries. They offer longer periods of operation between cleanings plus simplicity which enables ordinary workmen to quickly disassemble, clean and reassemble the filter on the spot. Turning a single handnut releases line model for cleaning without disturbing pipe connections.

BOTH SUMP and LINE TYPE are available in individual capacities from 5 to 100 gallons per minute and in mesh sizes from 30 to 200.

SUMP TYPE (Cutaway)



LINE TYPE (Cutaway)

For complete engineering data write for Folder 105

Meets J.I.C. Standards

MARVEL ENGINEERING COMPANY
625 W. Jackson Blvd. Chicago 6, Ill.

Simplify mine and tunnel ventilation

Here's the airduct that can take it! Now you can deliver air to the working face of mine or tunnel — cheaper! That's because SPIRATUBE-M is built to cut maintenance costs! Ease of handling reduces installation costs. Unique SPIRATUBE-M construction features minimize leaks and seepage. And you get the maximum efficiency of your blower or fan . . . cutting power costs!

Immediately available in diameters to 30 inches, from fully-stocked distributors, SPIRATUBE-M is made in tough high count fabrics, all specially treated and heavily coated inside and out to withstand fungus, mildew and rough treatment.

And, patented, *built-in,* quick-couplers eliminate the need for separate parts . . . no need to look for couplers when you're in a hurry.

For heavy duty, pressure ventilation tubing without wire reinforcement, ask for AYRTUBE®. Sold in diameters to 36", AYRTUBE by itself or in combination with SPIRATUBE-M offers you an inexpensive airducting.

Check these features:

Handling ease

Lightweight

Flexible

Easily installed by you

Takes sharp turns without crimping

Withstands fungus, mildew, rough treatment

Flexible Tubing CORPORATION

Guilford, Connecticut • Pasadena 1, California

FREE BOOKLET DESCRIBES SPIRATUBE-M and AYRTUBE MINING AND CONSTRUCTION APPLICATIONS. Write for your copy today.

FLEXIBLE TUBING CORPORATION, Dept. CA-1, Guilford, Conn.

Send me your SPIRATUBE-M Booklet

Name_____ Title_____

Company_____

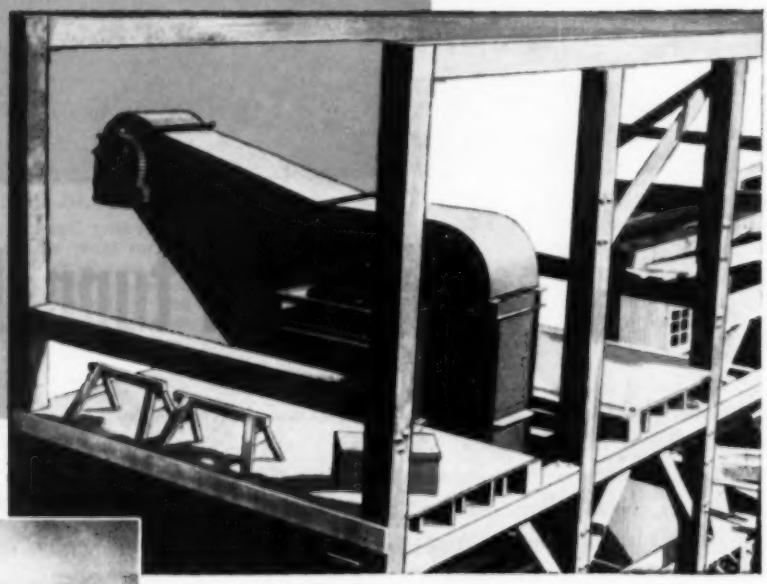
Address_____

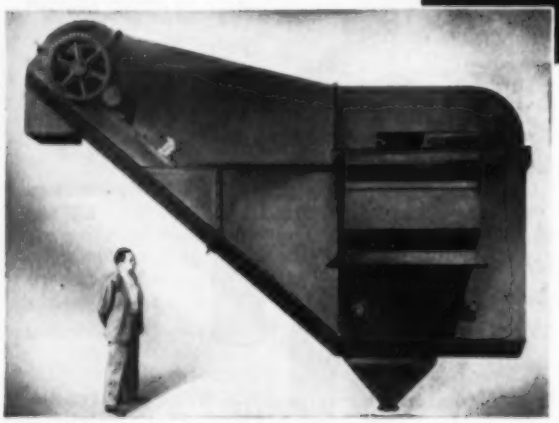
City_____ State_____

50% LESS FLOOR SPACE

Needed for *New* Wilmot-Daniels Heavy Density Unit

Unequalled Compactness Results from Its Complete-in-1-Unit Construction and Elimination of 5 Major Parts and 4 Motors. Unit Is also Custom-Designed to Fit Your Space. New System Eliminates the Two Most Common Heavy-Media Problems.





Above, size 150-A Wilmot-Daniels Heavy-Density unit; feed capacity, 150 tons per hour. Also available in sizes for finished product capacities of 50 to 500 tons per hour. Wilmot-Daniels units are furnished in 4 types to fit varying plant set-ups. All are of the complete-in-1-unit construction shown above.

The really revolutionary nature of the advances in efficiency made by the new Wilmot-Daniels heavy-media unit is indicated by the fact that it requires 50% less floor space. To this real reduction in capital cost, add the direct saving that results from the fact that the Wilmot-Daniels Heavy-Density unit is custom designed to your requirements and local conditions. You are not forced to adapt your plant to a "package" unit.

Remarkable simplicity is another advanced feature. The unit contains 5 less major parts and 4 less motors. It employs many standard parts for ease of maintenance. The refuse conveyor, for instance, is of the conventional flight type.

Let us send you Bulletin 521 describing the complete technical details of how this new system operates to increase yield and promote product control for both metal and coal producers.

Send for BULLETIN 521

WILMOT

WILMOT ENGINEERING CO. HAZLETON, PA. Plant: WHITE HAVEN, PA.

HEAVY DENSITY DIVISION

BUCYRUS ERIE

6-YARD

150-B

Brings NEW SPEED, POWER, CAPACITY

To Loading and Stripping

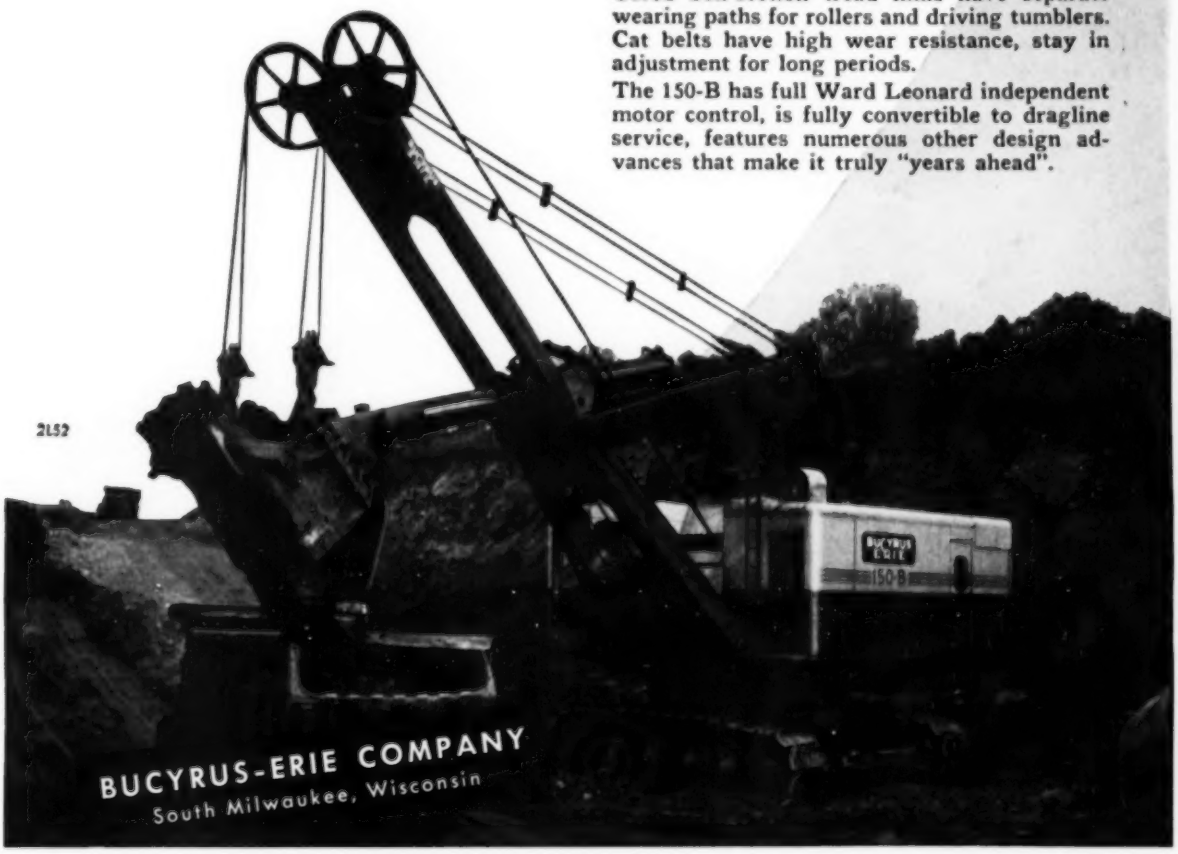
ADDED to the time-proved superiorities of design and construction which have made Bucyrus-Erie quarry and mining shovels traditionally "years ahead" are important features new to an excavator of this size, yet *thoroughly proved in the field*. Among these 150-B features are:

Exclusive Two-Section Boom with tubular dipper handle free to rotate in saddle block. Used with outstanding success on Bucyrus-Erie's large stripping shovels for many years, this design speeds the working cycle and permits increasing the payload because it reduces front end weight materially — yet provides enormous strength. Upper boom section carries only load resulting from pull of ropes, strong trussed lower section transmits directly to the revolving frame the vibrations, torsional and shock loads set up in digging. Rope crowd is quiet, positive, with crowd machinery located on the deck.

Powerful New Main Machinery designed for double twin hoist, smoothly delivers power where you want it, when you want it. Hoist machinery pulls dipper straight through tough banks with steady positive action. Fast smooth swing, with quick acceleration and deceleration, shaves seconds off every cycle.

Larger Stronger Mounting has new propelling machinery arrangement, which provides rapid engagement of the propel for fast move ups. Cored box-section tread links have separate wearing paths for rollers and driving tumblers. Cat belts have high wear resistance, stay in adjustment for long periods.

The 150-B has full Ward Leonard independent motor control, is fully convertible to dragline service, features numerous other design advances that make it truly "years ahead".



2152

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

markets for WASHED COAL

wherever you go!

. . . PITTSBURGH for instance

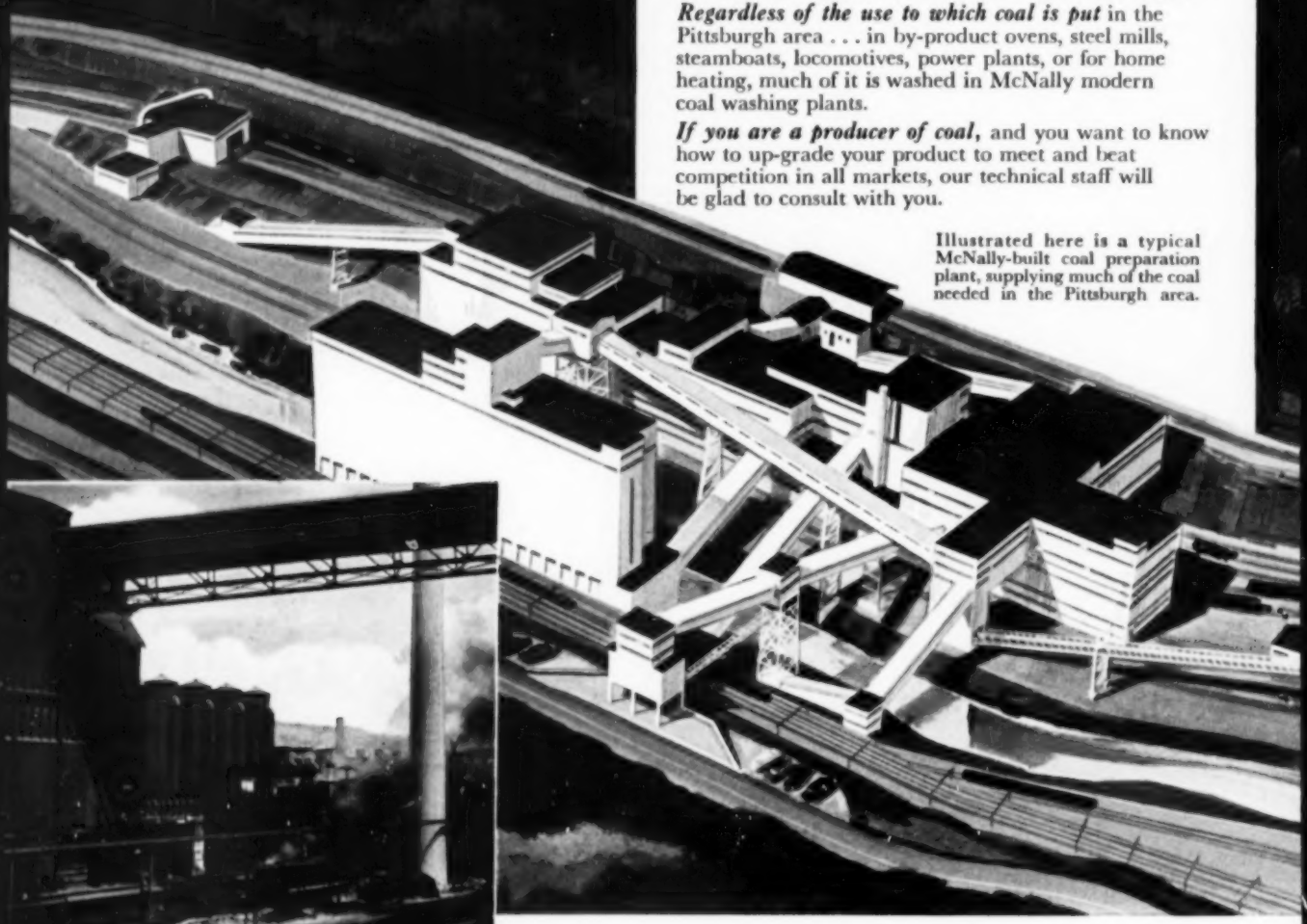
Pittsburgh . . . the city of steel, coal, and aluminum, has shed its mantle of smoke. Now it's a city with a bright, new sky line. Almost magically the "Point" has become the "Gateway." The breath-taking architecture and built-in cleanliness of the Alcoa and U. S. Steel buildings add their lustre to the Golden Triangle.

We salute the citizens of imaginative genius who are making their dreams of an ever greater Pittsburgh really come true.

Washed coal has contributed generously to the brighter sky line. Indeed, washing coal has up-graded vast reserves of steam coal to metallurgical quality that feed the hungry furnaces of this industrial empire.

Regardless of the use to which coal is put in the Pittsburgh area . . . in by-product ovens, steel mills, steamboats, locomotives, power plants, or for home heating, much of it is washed in McNally modern coal washing plants.

If you are a producer of coal, and you want to know how to up-grade your product to meet and beat competition in all markets, our technical staff will be glad to consult with you.



Illustrated here is a typical McNally-built coal preparation plant, supplying much of the coal needed in the Pittsburgh area.

By-product coke plant of United States Steel at Clairton, Penna. . . . a user of washed coal.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation — *Manufacturing Plants:* Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

THE McNALLY COMBINATION

enables you to

WIN PROFITABLE MARKETS

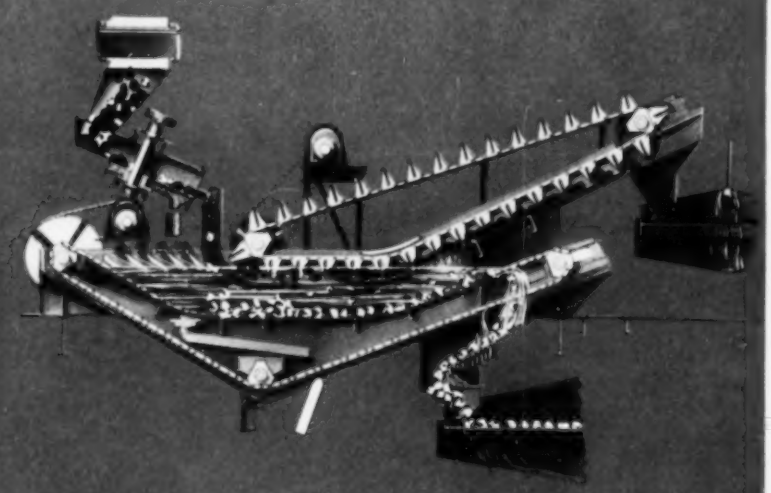
Run-of-mine coal on the one hand, and customers' demands on the other, can make mine superintendents' hair turn gray.

R.O.M. won't run uniform. Customers' demands are terrific . . . and your sales organization insists that your customer is right! If you are in that dilemma, we have help for you.

Take the McNally Tromp Dense Media Washer for example. It's just made to clean the more difficult low gravity, high accumulation coals that do not lend themselves to ordinary cleaning.

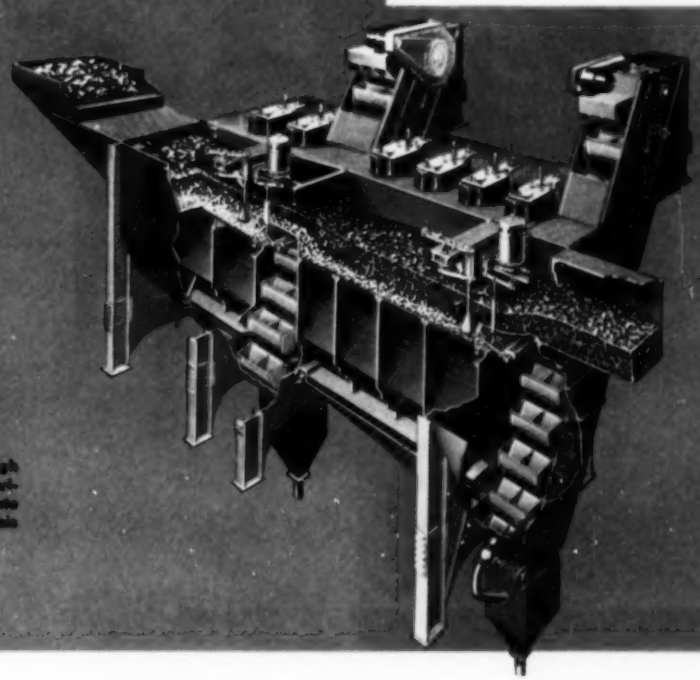
The Mogul Washer is another example. It washes wide ranges of unclassified coal and is particularly adaptable to coals having a high refuse percentage. With it you can produce greater tonnages of washed coal within the regular one or two shift working periods, without overtime.

Our technical staff will be glad to consult with you, without cost or obligation, to show you just what you can do to up-grade your coal.



McNALLY TROMP DENSE MEDIA WASHER

A full description could not be given here. 6 Full pages in Bulletin 481 are devoted to a complete description. It's profitable reading.



McNALLY MOGUL WASHER

The name indicates it's a high tonnage washer. 4 Pages in Bulletin 431 describe and illustrate it. By all means write for this informative Bulletin.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation — *Manufacturing Plants:* Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

IH scores again...

NEW INTERNATIONAL TRUCKS

Proved as only IH can prove 'em

The 307 new features in the *New* International Trucks have been . . .

> **Proved** in the world's most advanced truck Engineering Laboratory at Fort Wayne, Ind., **Proved again** on International Harvester's 4000-acre Arizona desert Proving Ground.

For profit-minded buyers. *New* International Trucks offer an unmatched combination of values—exactly the right truck for the job, unequalled performance, lowest maintenance and operating costs, maximum driver comfort.

Built the IH way. Choose from 168 basic models in America's most complete truck line. Each model embodies engineering principles, used in International's continuing program of truck research and development, that have resulted in hundreds of exclusive International features which have meant greater profits for truck buyers.

New International Trucks are BUILT as only IH can build them, PROVED as only IH can prove them, a VALUE only IH can give you.

Now—the features you want—in America's most complete truck line

New International styling identified by the IH emblem . . . **Exactly the right power** for every job. First truck builder to offer choice of gasoline or LP gas with Underwriters' Laboratories listing in 1½-ton sizes and other models . . . **Diesel power** optional in models rated 22,000 lbs. and over . . . **Designed by drivers for drivers**—Comfo-Vision cab with one-piece Sweepsight windshield. New comfort and interior styling . . . **Steel-flex frames** proved best in the field . . . **Transmissions** to meet any operating requirement . . . **296 Wheelbases** ranging from 102 inches up . . . **Easy starting and greater fuel economy** . . . **Wide range** of axle ratios for all models . . . **Real steering comfort and control.** Sizes from ½-ton to 90,000 lbs., GVW rating. Now—See The New IH-Built, IH-Proved Internationals at your nearest International Dealer or Branch.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL TRUCKS

"Standard of the Highway"

safe . . . compact . . .
low cost . . . easy to install . . .

HAZARD SELF-SUPPORTING CABLE
FOR POWER TRANSMISSION

Versatile . . . that's Hazard-Self Supporting Cable for power transmission in and around the mine. Its "all-in-one" construction (pre-assembled cable, messenger and binder) requires a minimum of space, makes it easy and quick to install . . . simple to relocate. And it can be furnished with Hazard's reverse-lay design which permits spreading of the conductors for easy tapping anywhere along the cable.

Because of these advantages, it is an ideal cable for overhead suspensions between buildings and shaft structures, carrying power through heavily wooded areas, and for side wall or roof suspensions in underground slopes and entries. For all power transmission lines, Hazard Self-Supporting Cable is engineered and constructed to give extra long life under the severest mine operating conditions.

Hazard Self-Supporting Cable is insulated with Watertite heat and moisture resistant insulation and protected by Hazard's famous Hazaprene ZBF sheath. This smooth, abrasion-resistant covering possesses maximum density and lasting toughness to stand up against weather and destructive mine water. In addition, Hazaprene ZBF sheath more than meets the requirements of the Federal Bureau of Mines and the Pennsylvania Department of Mines for flame resistance.

For complete information on this versatile power transmission cable see your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD Insulated wires and cables for every mining use

NEW

DODGE-TIMKEN ALL-STEEL PILLOW BLOCKS

HEAVY DUTY CAPACITY!

LESS SPACE! LESS WEIGHT!

A JOINT ENGINEERING DEVELOPMENT BY DODGE AND THE TIMKEN ROLLER BEARING COMPANY

- All-Steel construction
- A new Timken bearing design
- High radial and thrust capacities
- Compact—minimum dimensions
- Minimum weight with maximum strength
- Fully self-aligning with spherical outer race
- Both expansion and non-expansion types
- Adapter mounting, proven through the years
- Double piston ring seals
- Sealed both on and off the shaft
- Fully assembled, permanently adjusted, lubricated and sealed at the factory

Here are the bearings for industry's toughest jobs. High radial and thrust capacities. Stamina to take heavy shock loads. And all-steel construction packs this load-carrying capacity into less weight and less space. Engineers are already specifying "Dodge-Timken All-Steel" for some of America's largest projects. Write for details and delivery dates, or call your Dodge Distributor.

DODGE MANUFACTURING CORPORATION
3000 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

DODGE
of Mishawaka, Ind.

For TOUGH jobs with years of work ahead...

MARION 111-M Ward-Leonard Electric shovel owned by the Hydro-Electric Power Commission of Ontario, making a cut for an open canal and recovering aggregate for concrete work.

MARION 111-M
Ward-Leonard Electric

Rock and ore have a way of making things rough for an ordinary shovel.

The machine may win, in the first few months, over the stubborn resistance of shot rock. But it still faces the test of time, for rock and ore "wear down" an ordinary shovel and break its spirit.

It's on the tough jobs, with years of work ahead, that the MARION 111-M Ward-Leonard Electric shovel has a chance to prove its real worth. Today this MARION is winning the battle of the rock pile and the ore pit on many a front.

Its victories mean greater production, lower operating cost, less maintenance expense and fewer work stoppages. Its powerful electric muscles and the shock-tested members of its frames and machinery assemblies are making owners say, "This is it!"

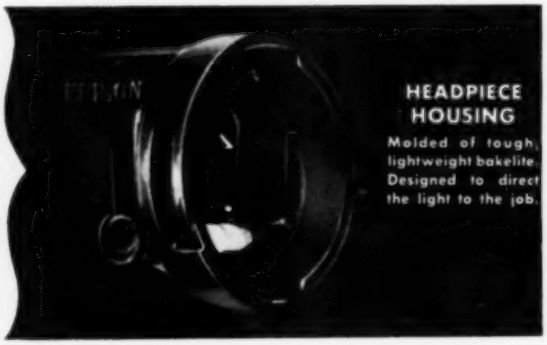
It doesn't cost anything to find out what the 111-M Ward-Leonard Electric can do for you. Your nearest MARION office will be glad to give you the facts.

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

from ¾ cu. yd. to 45 cu. yds.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

THE EDISON R-4



HEADPIECE HOUSING

Molded of tough, lightweight bakelite. Designed to direct the light to the job.

BRILLIANT LIGHT DEPENDS ON AN UNFAILING SOURCE

Quality that puts new Peaks on your Production!

IS WORTH LOOKING INTO

DOUBLE FILAMENT BULB

Two filaments of equal light output in one bulb. If one filament burns out, second filament restores full light.

ADJUSTABLE CRADLE

Positive screw control moves bulb cradle for accurate spot-beam focusing.

BEZEL RING AND LOCKS

Sturdy bezel makes tight seal, is easily removed. Contains rubber-cushioned lens. Locks prevent tampering.

EXCLUSIVE NICKEL-IRON-ALKALINE CELLS

Battery does not destroy itself to function; does not deteriorate when not in use. Welded steel containers enclose the cells, and the entire battery is encased in a high-strength, non-combustible, corrosion and impact resistant molded nylon case. The valve block is one-piece nylon construction; easily removed. All exterior metal parts are stainless steel. Rugged hood contains dependable magnetic lock device.

Convincing testimony that QUALITY COUNTS in underground illumination is provided by the world-wide acceptance of the Edison Electric Cap Lamp.

Designed from a thorough knowledge of overall mining problems, the Edison R-4, made up of compact, easily handled sub-assemblies, has the QUALITY features that keep a brilliant, unfailing beam on the job, shift-after-shift, for years.

We'll be glad to show you how this EDISON R-4 QUALITY can put new peaks on your production records, safely.

MSA
SAFETY EQUIPMENT HEADQUARTERS

MINE SAFETY APPLIANCES COMPANY
Braddock, Thomas and Meade Streets, Pittsburgh 8, Pa.
At Your Service: 69 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED
Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N.S.

When you have a safety problem, M.S.A. is at your service.
Our job is to help you.

Let's Call Wire Rope Constructions

by their Right Names!

This is a message of importance to every user and purchaser of wire rope. It is information that will help eliminate much of the past confusion over wire rope terminology.

How did this confusion arise? Let's illustrate briefly. For years 6 x 19 has been just a name for a variety of six-strand ropes, few of which actually have 19 wires per strand. As an example, our popular 6 x 19 W has always contained 25 wires per strand; the 6 x 19 U, 21 wires per strand. The 6 x 19 Seale, on the other hand, really does have 19 wires in each of its strands. Until recently, the letter or name following the numbers denoted the actual construction; but many users did not know this, and the omission of these symbols occasionally resulted in costly misapplications.

To clarify matters in the various classes of rope, Bethlehem has revised the entire list of misleading designations. For instance, in the Bethlehem terminology, Type W rope is now designated—accurately—as 6 x 25 W (not 6 x 19); Type Q is 6 x 41 Q (not 6 x 37). This completely accurate terminology applies to each and every rope that Bethlehem makes.

Nothing has been changed but the designation. The ropes are made to the same high standards of Bethlehem quality. *Constructions are the same as in the past.* Only the names, the designations, are different. The numbers now mean what they say.

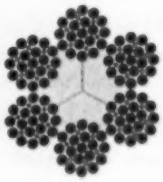
We earnestly solicit your help in publicizing this information. The transition now under way is one that has long been needed.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

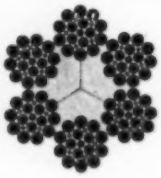
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

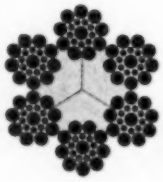
6 x 25 Type W



6 x 21 Type U



6 x 19 Seale



Of these three ropes, Seale is the only one with 19 wires a strand. Yet for years all three types have been known as 6 x 19. This is not an isolated case. Similar instances occur in other classifications of rope.

"TENOL CUTS OUR OPERATING COSTS"

"Saves us Wasteful Downtime"

Says McCoy Coal Co., Jasper, Alabama

J. V. McCoy, President

The McCoy Coal Company moves 150,000 cubic yards of rock a week in its strip mining operation. It takes 9 excavators, 6 tractors and 5 dump trucks working at peak efficiency to maintain this scale of operations.

Sinclair lubricants play an important part in the prolonged life and the producing-power of the McCoy equipment. Exclusive use of Sinclair TENOL, for example, has proved its value in actual money and time saved. Mr. McCoy, president of the company says:

"We've used TENOL in our shovels, drag lines and tractors for 7 years. In that time, we've mined over 1,200,000 tons of coal and we've found that TENOL is an *outstanding* engine oil. It has saved us a lot of wasteful downtime . . . slashed our operating costs by cutting repairs. We've run engines *as long as 5 years* before breaking them down . . . they all were clean. We're more than satisfied with our rate of consumption – it's remarkably low. TENOL has had some tough tests with us . . . it's tops"

Let Sinclair help with *your* lubrication problems. Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR TENOL®

for Prolonged Engine Life

Here's electrical equipment for record-breaking shovel performance!

This Westinghouse-equipped Marion shovel set a new world's record by removing over 1.5 million cubic yards of overburden in just one month at an Eastern coal-stripping operation. In addition, another Westinghouse-equipped shovel at the same mine stripped over 1.3 million yards.

Over a million yards a month averaged during 1951

To attain this average, the shovel moved an average of over 2,000 yards per hour by moving 33.91 cubic yards per pass with an average time of 60.43 seconds per complete cycle. This fast operation is the result of the carefully co-ordinated design of Westinghouse generators, motors and Rototrol® control.

Smooth, controlled operation increases production

The Rototrol control is the "brain" of the shovel operation. When fast action is necessary, as during the swing, Rototrol "forces" the electric drive. The responsive action is quick, fluid and smooth. This prevents any shocks to the equipment and speeds up your operation. Rototrol also makes it impossible to overstrain the machinery. For example, during the crowd operation, the motors will stall out rather than force the bucket and cables.

Dependability of equipment reduces down time

The durability of the equipment is another reason for the record-breaking performance. The Rototrol, for example, is a simple, sturdy device that can be serviced right in the field. The M-G sets have special spherical-sleeve bearings which compensate for misalignment and permit operation even at tilts of 15°. The motors are designed and built to insure maximum durability.

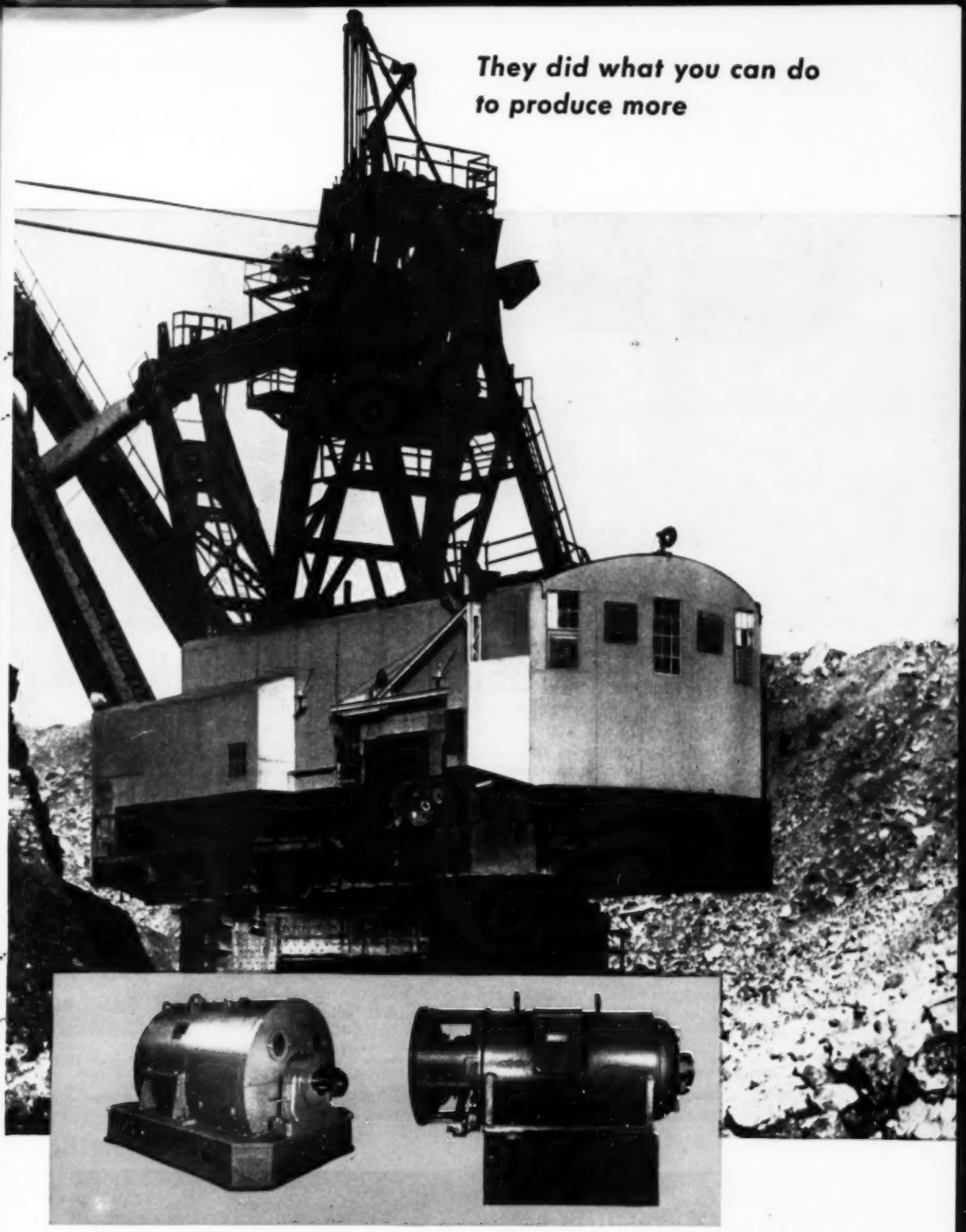
Call Westinghouse on your next project

This is a good example of the performance Westinghouse builds into electrical equipment for mining. The next time you're planning a project, call in Westinghouse early. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-94879

YOU CAN BE SURE...IF IT'S

Westinghouse

EQUIPMENT FOR THE MINING INDUSTRY



Westinghouse shovel motors are specially constructed to give you years of continuous operation even under the most rugged conditions. They are designed to help you get the most yardage out of your next shovel or dragline.

Rototrol is the master intelligence governing the shovel operation. It gives a quick, smooth responsive action to your operator's slightest control movement. This prevents shocks to equipment. The fast action cuts the digging cycle—speeds up production.

NO LEAD SHEATH TO HAMPER YOU!

Simplex-ANHYDREX Neoprene-Jacketed Cables will solve your underground power cable problems quick as a flash. They are easy to install. Usually it is only necessary to cut a slot in the "bottom" or the "rib" and put the cable in. Where space permits, the cable may be put in the "gob" and covered by suitable noncombustible material, if State and Federal Regulations will allow.

Simplex-ANHYDREX Neoprene-Jacketed Cables will not fall victim to stray currents, electrolysis, corrosion and other similar problems common in the use of metallic protected cables. If it should be necessary to relocate the cable it is a comparatively easy job to do.

The advantages of the Anhydrex neoprene-jacketed construction are many in comparison to the cumbersome, heavy, easily-damaged lead-sheathed cables. ANHYDREX Cables are much lighter than lead-sheathed cables and not easily damaged. The Anhydrex hard-service neoprene jacket has "built-in" safety that provides excellent resistance to abrasion, acids, alkalies, oil and flame.

When you want extra service, quality and true economy, be sure to specify Simplex-ANHYDREX Cables. For more complete information call your nearest Simplex representative or write in care of the address below.

Simplex - WIRES & CABLES

SIMPLEX WIRE & CABLE CO.
79 SIDNEY STREET,
CAMBRIDGE 39, MASS.

Here's your Field-Proved, Mobile Cutter for very Low Vein Coal

. . . the JOY 12-RB Cutter

and here's the rest of the JOY LOW VEIN TEAM

Meet the JOY 12-RB, above . . . the cutter member of the *only* mechanized mining team designed specifically for high-capacity production in very low vein coal. With the Joy 20-BU-1 Loader and 8-SC Shuttle Car, it assures field-proved flexibility and economy never before available to mines operating in extremely thin seams.

The 12-RB is a highly mobile and maneuverable rubber-tired cutting machine only 26" high, supplied either as a top or bottom cutter, and readily convertible. Its high tramming speed and variable hydraulic feed (which provides a cutting rate up to 70 ft. per minute) together permit cutting more places per shift. Bar tilt, roll and lift are hydraulically controlled, and steering is also hydraulic, with a separate motor serving the hydraulic pump.

20-BU-1 LOADER ↑ and the 8-SC SHUTTLE CAR →

Only 24" high, yet can load up to 8 tons per minute. Fast tramming, easily maneuverable, features independently driven conveyor and gathering head. While a shuttle car is away, the gathering arms can provide a fully-loaded conveyor ready for quick loading when the car returns. Also permits continued loading even if the gathering arms are momentarily stalled with hard digging.

Features 4-wheel positive drive, 4-wheel hydraulic steering, tapered-end design for minimum turning clearance, height of only 26" and level capacity of 2 tons. Separate motors for traction, conveyor drive, and hydraulic pump drive. Disc-type brakes on all wheels, hydraulic cable reel and hydraulically-adjustable elevating discharge.

SULMET CARBIDE BITS

Joy Sulmet Bits, tipped with sintered tungsten carbide inserts, are made in a variety of types and different degrees of hardness to meet any mining condition. They fit any cutter, and by actual case records, out-perform every other bit on the market.

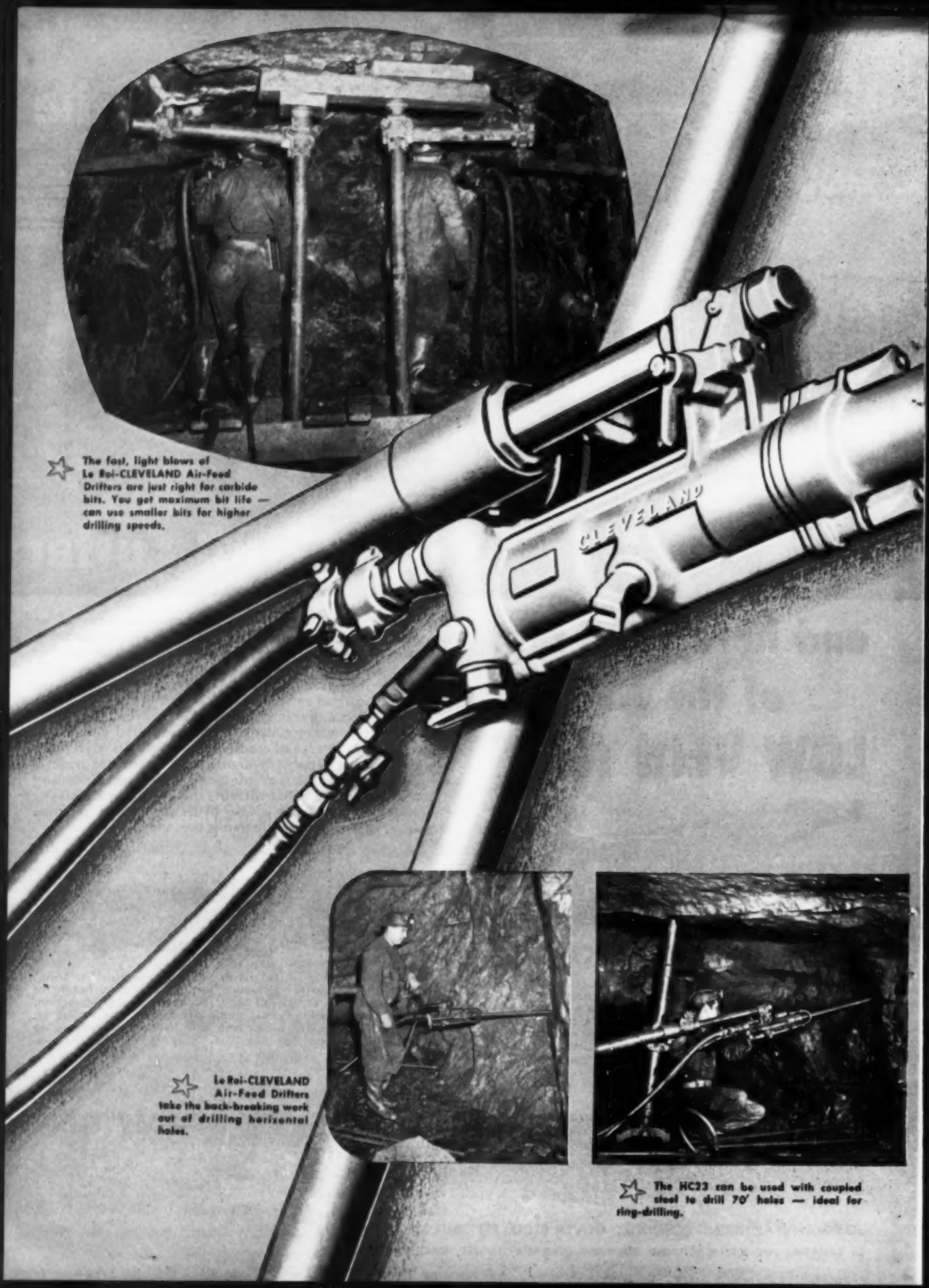
JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

JOY MANUFACTURING COMPANY, OLIVER BLDG., PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

W&D CL 4461



The fast, light blows of Le Roi-CLEVELAND Air-Feed Drifters are just right for carbide bits. You get maximum bit life — can use smaller bits for higher drilling speeds.

Le Roi-CLEVELAND Air-Feed Drifters take the back-breaking work out of drilling horizontal holes.

The HC23 can be used with coupled steel to drill 70′ holes — ideal for ring-drilling.

Tonnages go up!

Drilling costs go down!

with Le Roi-CLEVELAND Air-Feed Drifters

YOU lighten the load on miners — take the hardest part of the work out of drilling — when you equip them with Le Roi-CLEVELAND Air-Feed Drifters. Men don't tire so fast — safety records improve — tonnages rise.

Here are some reasons why: (1) You can use the Model 83 lightweight pneumatic air column to speed set-ups. (2) Fast reverse feed makes changing steels quick and easy. There are no swing or dump nuts to loosen or tighten. (3) Positive air feed gives right pressure for maximum drilling speed. (4) Fast, light blows are just right for carbide bits.

Le Roi-CLEVELAND Air-Feed Drifters are available in two sizes: HC10R with $2\frac{5}{8}$"-bore machine and HC23R with $3\frac{1}{8}$"-bore machine. See how either model gives you longer bit life, lets you use smaller bits for higher drilling speeds — helps you get higher man-shift production, greater safety, and lower drilling costs. Write for further information.

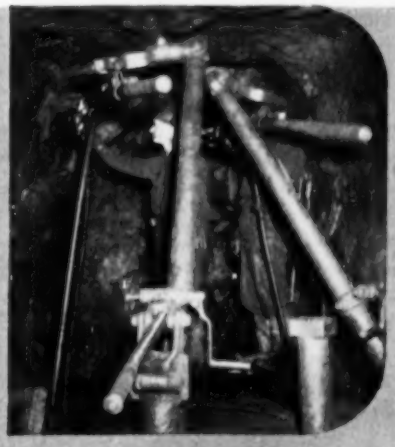
LE ROI COMPANY CLEVELAND ROCK DRILL DIVISION

Plants: Milwaukee, Cleveland and Greenwich, Ohio

12500 Berea Road, Cleveland 11, Ohio

☆ Le Roi-CLEVELAND Air-Feed Drifter mounted on air-motor-powered boom of Le Roi-CLEVELAND Self-Leveling Mine Jumbo in a Western zinc and copper mine.

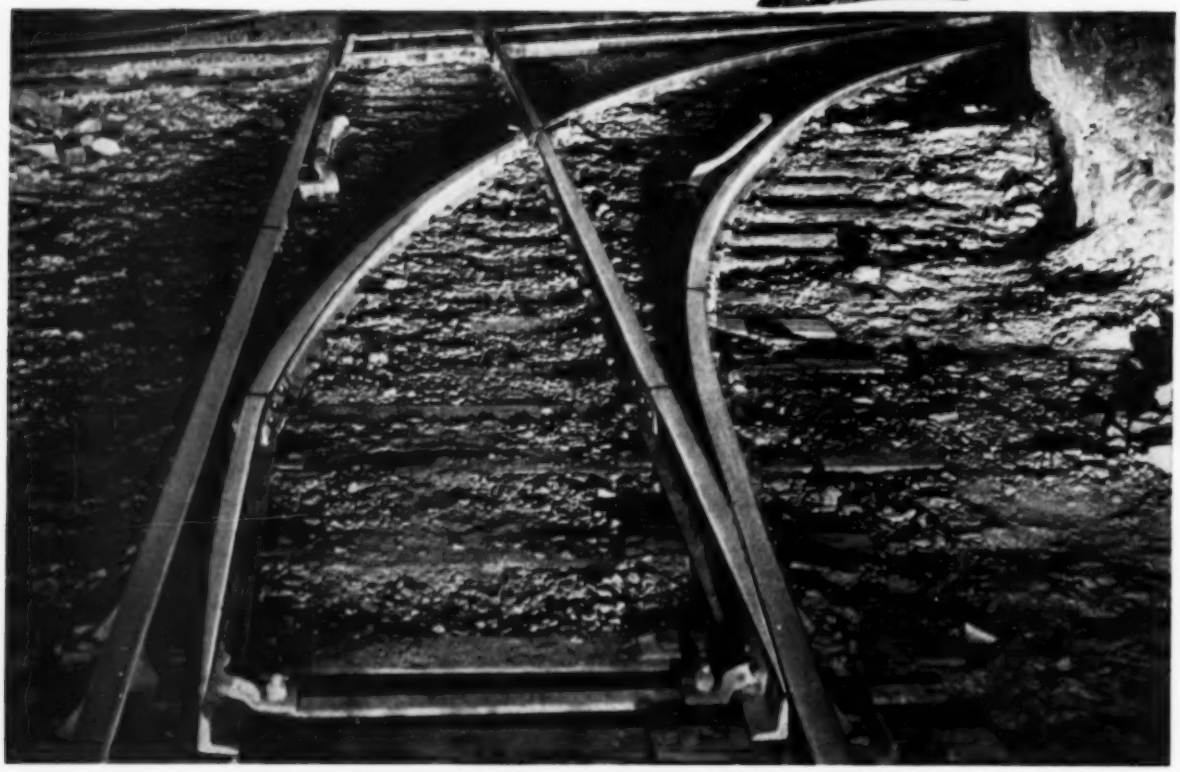
☆ Feed controls are conveniently located on Le Roi-CLEVELAND Air-Feed Drifters. Reverse air feed withdraws steel from hole quickly.



☆ The accent's on production in this mine. Le Roi-CLEVELAND Air-Feed Drifters make possible faster set-ups, faster steel changing, faster drilling.

80-80

The Smooth Trip is the Safe Trip



A load of coal doesn't care much about comfort, but a smooth trip from the working face is important just the same. Because a smooth trip, on solid, sturdy, well-aligned track, is a *safe* trip . . . one without bumps, jolts, or derailment hazards.

Above you see some very fine trackage in a West Virginia mine. It's a Bethlehem prefabricated job, and it's the sort of track that means the smooth, fast haulage everybody's looking for. Note that long stretch of rails without a ripple. Note the clean, symmetrical turnout; the curves are perfect. And note, too, how well the switch points align with the closure rails, and how snugly the point in the right foreground fits against the stock rail. Everything about it suggests a safe haul.

This is the kind of track that really tones up underground traffic. Any mine can have as good a layout, for all Bethlehem prefabricated track is built with the same degree of care. It does not matter how large or complex your system may be; a Bethlehem layout is planned and engineered for the individual mine, with the mine's own peculiarities taken into account. Rails are precut to proper lengths, precurved to proper radii; turnouts are figured exactly so that there are no assembly problems.

Another thing: the layout comes to you complete—rails, switches, switch stands, frogs, guard rails, braces, joint bars, steel ties where needed, and even the bolts, nuts, and spikes. Nothing is missing, and Bethlehem stands behind every component. Full details are yours for the asking.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

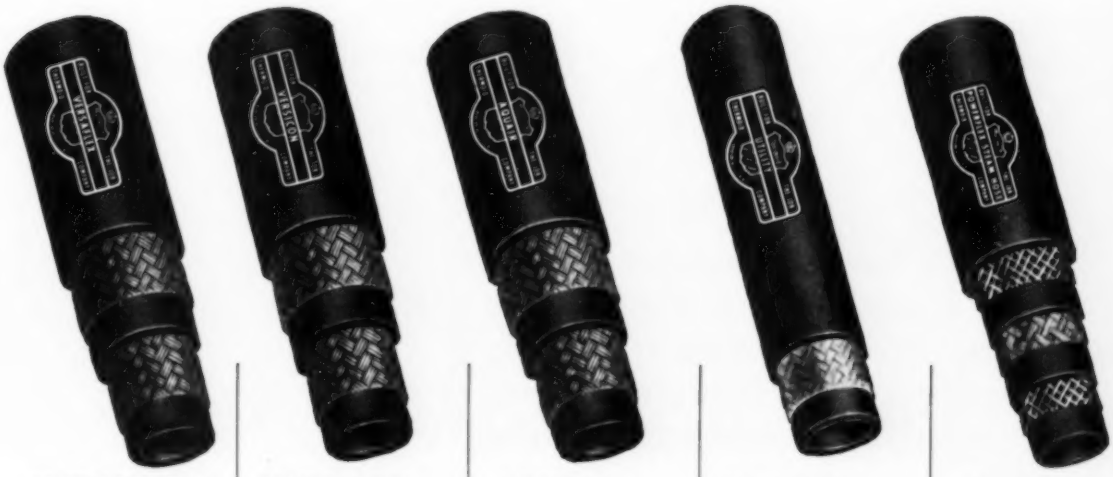
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM PREFABRICATED TRACK

now! 5 basic types of Thermoid hose do the work of eighteen!

The new Thermoid line of molded hose cuts handling time and storage costs 70% or more in a wide variety of industrial and commercial uses! Thermoid's "Basic Five": Versaflex . . . Versicon . . . Aquair . . . Utility . . . Powerflex . . . now combine simplification and versatility with Thermoid top quality construction. And Thermoid's new standard color identification eliminates confusion in storage and stock selection!



VERSAFLEX
Multi-purpose hose built to withstand higher pressures. Recommended for butane, propane, insecticides, etc. Color code: *Red.*

VERSICON
A true all-purpose hose for virtually every type of air, gas or liquid. Color code: *Brown.*

AQUAIR
Rugged, dependable hose for handling air, water, welding gases. Color code: *Green*.*

UTILITY
Most practical hose for air, water and illuminating gases at pressures from 75 to 125 psi. Color code: *Black.*

POWERFLEX
Designed specifically for super heated steam at pressures from 100 to 200 psi. Color code: *Black.*

You can definitely simplify your buying, inventory, storage and stock selection with Thermoid's color-coded "Basic Five". Get full information from your distributor or write direct for Hose Catalog No. 3680. It's yours for the asking.

**Also furnished with Red Cover for acetylene*

Thermoid

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Compa y • Offices & Factories: Trenton, N. J., Nephi, Utah

more and more MANITOWOCS on more and more stripping operations

Peter Kiewit & Son move in big MANITOWOC 4500 to strip Fortune Lake Development

Another big stripping job, and another big Manitowoc takes over. The Fortune Lake open pit mine, in Northern Michigan, owned by Pickands Mather & Co., is being stripped by veteran contractor Peter Kiewit & Son of Omaha, Nebraska.

Kiewit knows earth-moving and knows his equipment too. On the job went a 5 yd. Manitowoc Dragline to handle the difficult assignment. The Manitowoc 4500 had proved its mettle many times previously — proved its ability to lick tough jobs, profitably — so it was only natural to have a 4500 break ground.

Whether it's ore or coal, mining or stripping, you too will find a Manitowoc the most profitable investment you can possibly make. Included in the Manitowoc line are special hi-lift shovels, long reach draglines, designed for mining and stripping. May we send you complete information? Manitowoc Engineering Corporation, Manitowoc, Wisconsin.

MANITOWOC Steel Crane

SHOVELS 1-5 YD. CRANES 18-100 TON

Eaton 2-Speed Axle Trucks

Quicker trips with no sacrifice of payload. Lower operating and maintenance cost, because engines operate in their best speed range. Less wear and strain on engine and vehicle. More miles in the life of the truck. Higher trade-in value. Eaton 2-Speed Axles will lower your hauling costs for you. Ask your truck dealer to prove it.

EATON — AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Short or Long Term CAPITAL LOSS?

No matter how they are figured—eye accidents are costly to industry. Here are some of the estimated charges:

1. They cost nearly $400 in average compensation.
2. They cost $176,000,000 in lost man hours annually at an average per hour rate of $1.60.
3. They cost an unknown but sizeable sum in idle machine time. (Remember, industry invests $6,000 or more in tools to provide each job.)
4. They cost another appreciable sum in impaired worker morale.
5. They cost additional money in increased rejects and lowered output when green workers must be substituted for skilled.
6. They cost money in first aid and medical attention whether the eye injury is major or minor.

Any industrial eye accident is a capital loss. If you lose the skill of a valued worker through the loss of an eye, you have a long-term capital loss in a very real sense—with no gain, long or short, to compensate. Contact your nearest AO Branch Office and learn how an AO Eye Protection Program can practically eliminate these costs and pay for itself in less than six months. Or write American Optical Company, 562 Vision Park, for free booklet "Improved Industrial Vision" which tells how AO's Industrial Vision Program cuts costs, increases production, decreases accidents.

American Optical COMPANY
SAFETY PRODUCTS DIVISION

Southbridge, Massachusetts • Branches in Principal Cities

BIGELOW-LIPTAK

Coal Dryer Furnaces

FEATURE

THIN WALLS ...in the heat of things

Special air inlet tile—developed from B-L's modern, unit-suspended thin wall—cuts maintenance to the bone in this coal dryer furnace.

The furnace furnishes 93,000,000 BTU's at a temperature of 1200° F to a rotary dryer. This application of thin wall construction features a specially-designed air inlet tile.

Ample furnace volume is provided to permit efficient stoker operation. The air-inlet tile permits tempering air to be drawn into the enclosure to reduce the flame and furnace temperature. Adjustable louvres located in the upper front and side walls draw outside air over the arch and down into the wall air lanes and into the furnace. When a constant volume of gases at a certain temperature is desired, it is only necessary to adjust the louvres. Radiation losses are reduced to a minimum by recovering and re-introducing the pre-heated air into the furnace.

Bigelow-Liptak dryer furnaces furnish heat for the coal, chemical, lumber, salt, sugar, grain and other industries.

Write for this catalog—today!

BIGELOW-LIPTAK *Corporation*

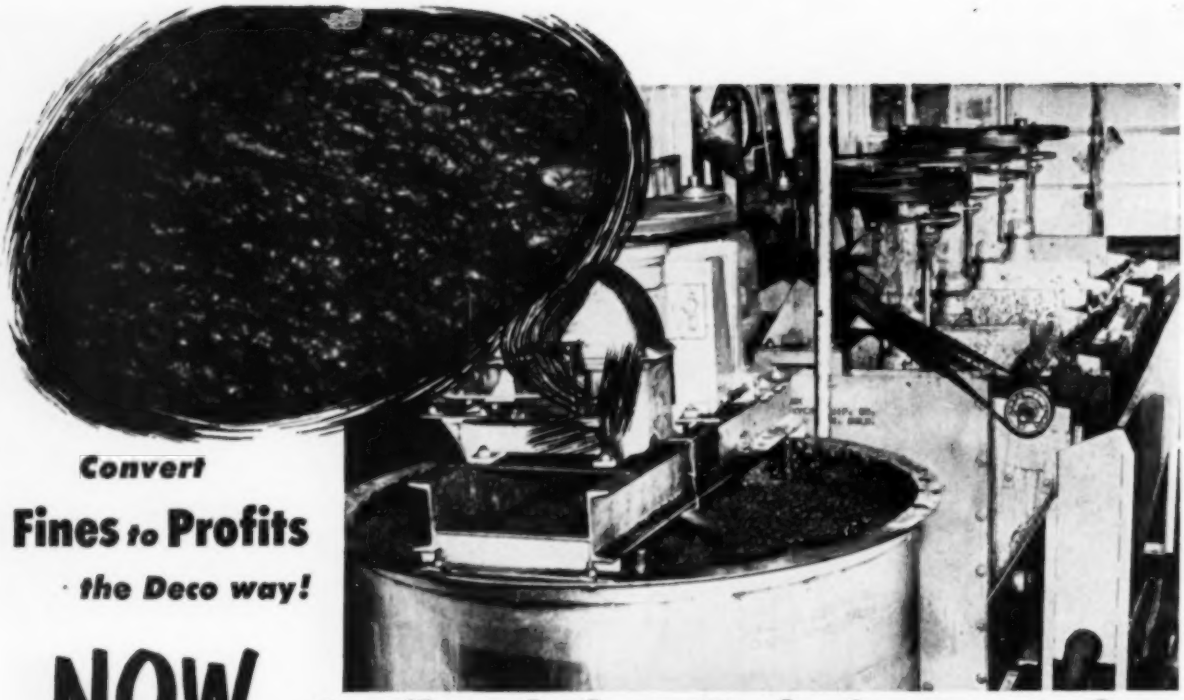
and Bigelow-Liptak Export Corporation

2550 W. GRAND BLVD. • DETROIT 8, MICHIGAN

UNIT-SUSPENDED WALLS AND ARCHES

In Canada: Bigelow-Liptak of Canada, Ltd., *Toronto, Ontario*

ATLANTA • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DENVER • HOUSTON • KANSAS CITY, MO. • LOS ANGELES • MINNEAPOLIS • NEW YORK PITTSBURGH • PORTLAND, ORE. • ST. LOUIS • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SAULT STE. MARIE, MICH. • SEATTLE • TULSA • VANCOUVER, B.C.



Convert

Fines to Profits

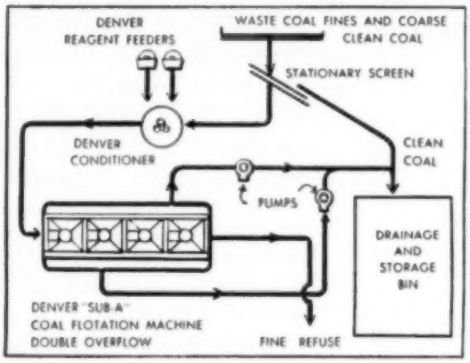
the Deco way!

NOW...Small Coal Plant Washeries Can Cash In On Reclaiming Fines...with Denver "Sub-A" Flotation!

Denver "Sub-A" Flotation gives operators of small washeries a low-cost method to recover fines at extra profits. You can recover a low-ash, clean coal product (—20 mesh to 0 mesh) that would otherwise be wasted. Recovery of fines can be the difference between breaking even and profit.

Coal fines, increased with mechanized mining, can now be recovered and cleaned with flotation. You reduce stream contamination, and you get a marketable product because of low-ash and sulphur content. Marketing is easy! Many washery operators simply add fines to their regular market product.

Why not cash in on extra recovery and make more profits with Denver "Sub-A" Flotation. Eliminate washery waste. Denver Equipment Company is the world's largest manufacturers of Flotation Machines. Let Denver Equipment Company engineers suggest an economical flotation layout for your washery or breaker—regardless of size. Find out about Deco's coal flotation test. Write, wire or phone today!



TYPICAL DENVER "SUB-A" FLOTATION RESULTS FOR FINE COAL FLOTATION

PRODUCT	% Weight	Analysis % Ash	Density % Solids
Feed to Flotation	100.0	23.5	20.0
Coal Flotation Concentrate	77.6	6.4	36.5
Refuse Waste	22.4	82.8	7.8

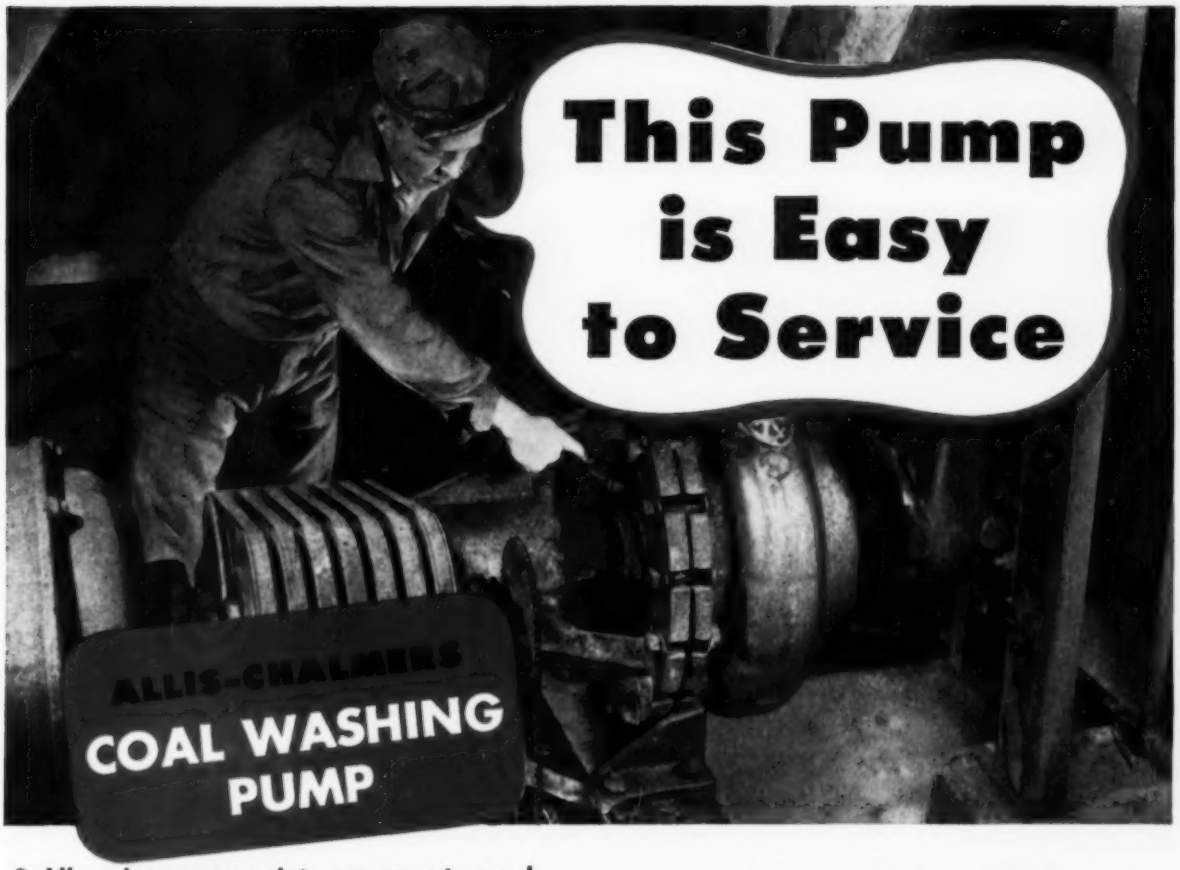
Reagent cost per ton of coal concentrate, 6.5c.
Moisture in filter cake, 21.5%.
Size analysis flotation feed, 20 x 0 mesh.

DECO FLOTATION ENGINEERS — DENVER EQUIPMENT COMPANY — 24 HOUR SERVICE

OUR 25TH YEAR OF FLOTATION ENGINEERING

DENVER EQUIPMENT COMPANY

1403 17TH STREET — DENVER, COLORADO



- **All maintenance points are easy to reach.**
- **Can be taken down and returned to service in less than a half hour.**
- **Many parts interchangeable between different pump sizes.**

Here's a pump that maintenance men like. The Allis-Chalmers coal washing pump is solidly built to stand rough coal washing service. And it's easy to work on. Notice how accessible the packing gland is. See how the casing bolts are arranged. Just loosen the nuts a couple of turns and the bolts lift out.

Wearing parts separate into easily handled units. In fact, one man can tear down an Allis-Chalmers coal washing pump, replace a part and have it back in action again *in less than a half hour*. Piping need not be disturbed unless the casing is replaced.

COMPLETE PUMPING UNIT FURNISHED

This pump is equipped with *Texrope* V-belt drive and *Vari-Pitch* sheaves. Head and capacity can be varied instantly by the turn of a crank. Allis-Chalmers can furnish the complete pumping unit — pump, motor, control and drive — assembled and ready to run.

GET THE COMPLETE STORY

Every Allis-Chalmers coal washing pump is application-engineered by a specialist who knows coal washing equipment problems and how to solve them. Your nearby Allis-Chalmers representative will be glad to give you complete facts and figures on CW pump performance. Or write Allis-Chalmers, Milwaukee, 1, Wisconsin and ask for Bulletin 52B6381. A-3951

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

NOW

...even longer wear

Impeller and suction wear plate now made of *Ni-Hard* alloy at no extra cost. You get longer wear . . . lower pumping costs.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

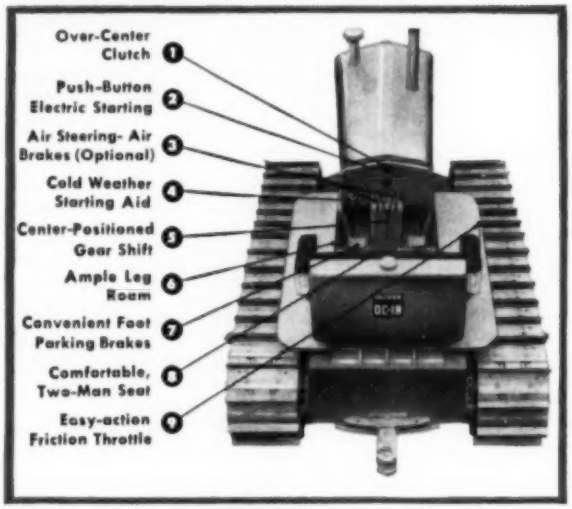
Owners' pride . . . Operators' delight the NEW OLIVER "OC-18"

OWNERS can't say enough good things about the new Oliver "OC-18." They keep telling us how it does more work . . . how that full 133* drawbar horsepower gives it plenty of power for the really tough jobs . . . about its low operating and maintenance costs . . . and how the operators and mechanics like it.

OPERATORS are even more enthusiastic. It's the first big tractor they've found that is designed to make life easier for them. They tell us that toward the end of a long day on the "OC-18," they are much less fatigued, much more fit to continue giving top performance. The illustration shows clearly the 9 important "easy operating" features of the "OC-18." No other tractor boasts all these. They make the "OC-18" "the operators' dream come true."

Ask your Oliver Industrial Distributor to arrange a demonstration. Or if you prefer, write to The Oliver Corporation, 400 W. Madison St., Chicago, Illinois.

*OFFICIAL NEBRASKA TEST NO. 489



THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Ill.

A complete line of industrial wheel and crawler tractors

LEADOLENE
Klingfast

THE "IP"* LUBRICANT

PROVES PROFITABLE FOR THE TOUGH LUBRICATING JOBS

IN MECHANIZED MINING

Specifically compounded for your particular needs, LEADOLENE KLINGFAST is a tough, lead-based lubricant with a great variety of applications in the coal industry. This lubricant . . . with its "indestructible pH-ilm" making possible efficient lubrication even in the presence of coal dust and other abrasive factors . . . regularly reduces costs and extends equipment life on the toughest of applications.

We suggest you read the accompanying case histories to see what LEADOLENE KLINGFAST has done for others . . . then describe your toughest lubrication problem and Brooks will prepare a sample designed to give best service on that particular application.

*I.P. . . . "Indestructible pH-ilm," capable of withstanding pressures up to 50,000 psi.

The Brooks Oil Co.

Since 1876

Executive Offices and Plant.....CLEVELAND, OHIO
Executive Sales Office.....PITTSBURGH, PA.
Canadian Office and Plant.....HAMILTON, ONTARIO
Cuban Office.....SANTIAGO de CUBA

Case Studies

WIRE ROPE

A certain strip mining shovel, on which a conventional lubricant was used, had a wire rope failure on an average of every 18 days of service. A single application of KLINGFAST extended the service to a record of 31 days.

CORROSION PROTECTION

Due to sulphurous and other extremely corrosive agents used in quenching, the steel work in and around the quencher station of by-products coke plants is subjected to most severe corrosion. In one specific application maintenance costs were particularly high since no paint would protect for as much as a year. A grade of KLINGFAST, which was brushed on as a protector coating, gave in excess of two years of protection.

OPEN GEARS

A motor-operated hoist equipped with double herringbone cut teeth pinions and gears is used to operate 5-ton clam shell buckets at a large coke plant. Although a high grade plastic compound was applied every 24 hours, it failed to prevent wear of the gearing. On this application, which includes intermittent operation, reversing, high speed, severe shock and contamination from coal dust, KLINGFAST is applied only once every 10 days, and costs 25% less per pound than the lubricant it replaced.

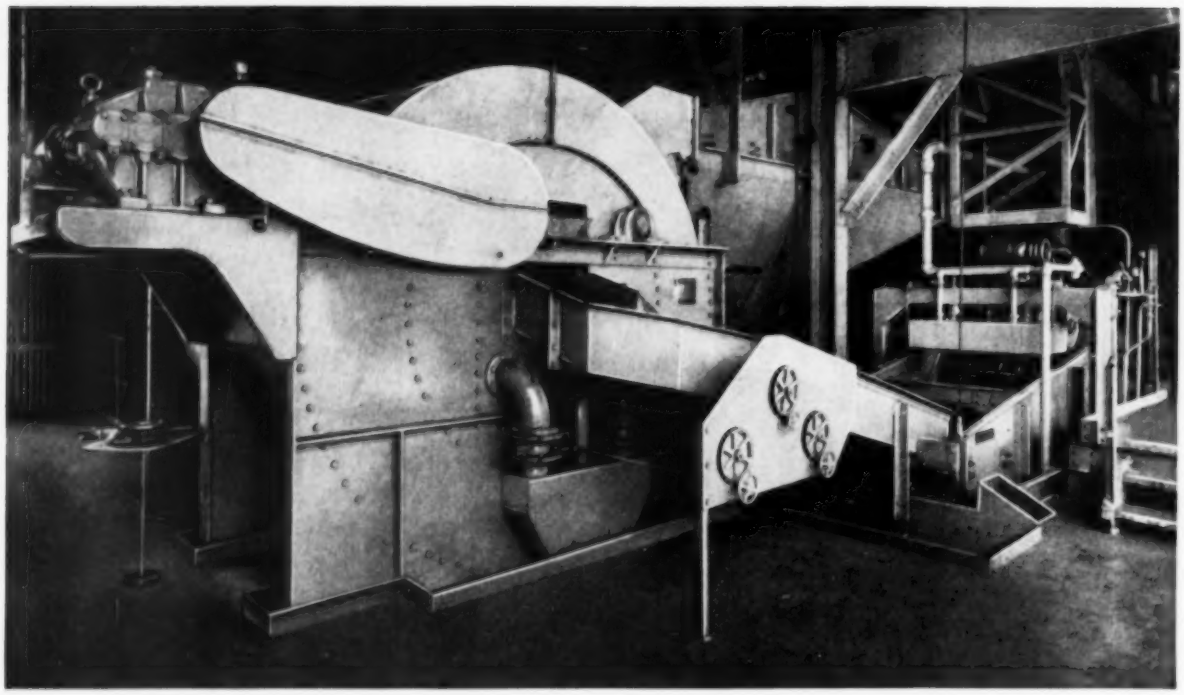
DIPPER STICKS

Due to excessive moisture and other conditions, a company had to lubricate their shovel dipper stick once each day. Since KLINGFAST has been adopted as their standard, lubrication application now is necessary only once every three weeks.

MINE EQUIPMENT

Mining machines are quite a problem in lubrication because of water, dust, shock, vibration, speed and excessive loading. LEADOLENE fluids have proven a great advantage in the gear cases of loaders in one large mine because of repellence of water, adhesiveness to prevent excessive leakage, high film strength to prevent wear of gears and worms and other characteristics for this tough job. Lubricants take a terrific beating and LEADOLENE is one that stands up and takes it.

Write Today for Free Sample!



NEMACOLIN MODERNIZES

With NELDCO Dense Media Coal Cleaning

At the Nemacolin Mine of Buckeye Coal Company the raw coal produced is high both in ash and sulphur content. In order to up-grade this coal to metallurgical requirements, the separation of the impurities by the float-and-sink method requires a bath density ranging less than 1.45 specific gravity. The picture above illustrates one of two NELDCO Dense Media Processors which clean 450 tons of 5" x ¼" coal an hour. The commercial results from this installation are within 1% of theoretical laboratory float-and-sink determinations.

The Nemacolin plant is typical of many NELDCO Dense Media installations in this country and in Europe where improved efficiency and improved control of coal quality has been made possible by this modern, efficient and economical coal cleaning system.

The entire modernization program at Nemacolin including plant design, equipment and erection was handled by the Davis organization.

If you have a coal cleaning problem we shall be very glad to have the opportunity to work with you.

We design and build coal cleaning plants in any size—any capacity, either single or two-stage separations to suit your conditions.

NELDCO

Standardized Packaged Coal Cleaning plants are available for single-stage cleaning in six sizes—capacities 50 to 325 tons per hour.

Catalogs Sent on Request

NELSON L. DAVIS COMPANY 343 SO. DEARBORN ST. **CHICAGO 4, ILL.**

DESIGNERS AND BUILDERS OF COAL CLEANING PLANTS USING THE DENSE MEDIA PROCESS

There is only one like this

There is only one Rust-Oleum

RUST-OLEUM®

STOPS RUST!

Specify Genuine Rust-Oleum
Accept No Substitute

The *exclusive* Rust-Oleum formula was developed by a Master Mariner during more than 20 years of combating the terrible rust-producing conditions of the sea. It incorporates a *specially-processed* fish oil vehicle that *dries*, is *odor-free*, and is formulated in *many colors*. It may be applied directly over *sound rusted surfaces* after scraping and wirebrushing to remove rust scale and loose particles. See why nearly every type of industry in the world has relied upon Rust-Oleum for over a *quarter century*. Clip the coupon to your letterhead and mail today.

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Gentlemen: I am interested in the *complete* Rust-Oleum story. Please send me the facts and the name of my nearest Rust-Oleum Industrial Distributor.

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Address_____
City_____ State_____

3

GRADES OF SELECTED DIAMONDS

2

IMPROVED TYPES OF CAST-METAL MATRICES

2

MODERN POWDERED METAL MATRICES

DOUBLE-TUBE REAMING SHELL

Available in all standard sizes for use with all types of double-tube corebarrels. Special sizes and types as required. Inserts are tough tungsten-alloy matrix set with carefully selected diamonds.

SINGLE-TUBE REAMING SHELL

Available in all standard sizes for use with all types of single-tube core barrels. Larger sizes and special designs as required. In order to fill orders promptly for either single- or double-tube reaming shells we must know the make and model of the core barrel.

CASING-SHOE BIT

Available in the same wide range of sizes and types as our standard casing bits and designed so that they can be left on the end of the casing in the hole while drilling is continued through them with the corresponding standard size of core barrel and bit.

STANDARD CASING BIT

Available in all standard sizes with a choice of four different matrices and three different grades of selected diamonds. Larger sizes and special designs furnished as required. Must be removed before continuing to drill with core barrel and bit.

We KNOW What These Bits Can Do

Because Our Own Drilling Crews Use Them

For more than sixty years Sprague & Henwood, Inc. has been a leader in the field of Contract Diamond Drilling and our crews—operating throughout the United States and many other countries—have constituted the best possible "laboratory" for proving the quality of Sprague & Henwood bits. They demand the best and we can't afford to give them anything less.

As manufacturers, therefore, we are in the highly advantageous position of KNOWING the relative value of every Sprague & Henwood bit for any given drilling condition, from the performance records of our own crews. And this valuable information is passed on to bit purchasers without charge or reservation.

If you use diamond drilling bits we want you to have a free copy of our new Bulletin No. 320. Write for it today and tell us about your drilling conditions. Our experienced executives welcome opportunities to make money-saving recommendations.

CONTRACT CORE DRILLING

is a very important phase of our business. This includes exploratory drilling for coal and ore — also foundation testing for bridges, dams and other heavy structures. Experienced crews and supervisors are available for service anywhere in the United States and many other countries. Estimates submitted on request.

SPRAGUE & HENWOOD, INC. Scranton 2, Pa.

See our four-page insert in the McGraw-Hill Mining Catalogues

STANDARD CORING BIT

Available in four different matrices and three different grades of correctly-sized diamonds. EX, AX, BX and NX sizes carried in stock. Larger sizes and special designs furnished to meet any specifications or requirements.

IMPREGNATED CORING BIT

Especially suitable for drilling through hard, broken or extremely abrasive ground, where diamond loss from surface-set bits might be excessive. EX, AX, BX and NX sizes carried in stock. Larger sizes and special designs as required.

SERIES "M" CORING BIT

For use with Series "M" Double Tube Corebarrel as developed by Sprague & Henwood, Inc. to meet the need for a higher percentage of core recovery from soft, broken or friable material than can normally be obtained with a standard double-tube corebarrel. Available in all four types of matrix and three different grades of diamonds. Also in a complete range of "impregnated" type bits. EX, AX, BX and NX sizes carried in stock.

"CONCAVE" TYPE NON-CORING BIT

Especially suitable for drilling round smooth holes in relatively soft formations, when cores are not required. All standard sizes available in four different types of matrix.

"PILOT" TYPE NON-CORING BIT

Recommended for drilling blast holes in hard formations and also for use when long straight holes must be drilled in variable formations.

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The fastest cutting bit for drilling blast holes in very hard formations. All standard sizes.

COAL DRYING

Over and over again, C-M-I has proved itself to be the last word in centrifugal know-how, engineering and workmanship. Since acquiring all basic patent rights of the original Elmore Dryer over forty years ago, C-M-I has continued to develop the principal of centrifugal drying, producing units that are reaching previously undreamed of peaks of performance and efficiency.

To further serve the Coal Industry, we maintain a complete laboratory to aid in solving individual dewatering problems. We will be very happy to aid you.

Write, wire or telephone Prospect 2848.

C·M·I
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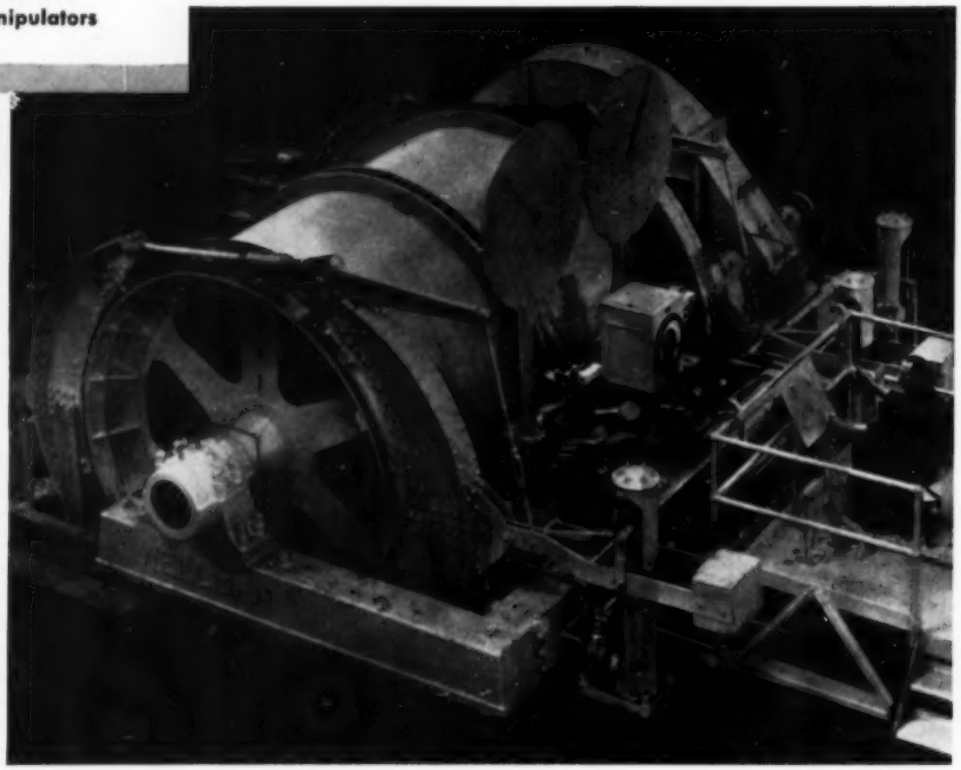
CENTRIFUGAL & MECHANICAL INDUSTRIES, INC.
146 PRESIDENT STREET ST. LOUIS 18, MO.

Wellman will build it

Special Cranes
Mine Hoists
Car Dumpers
Gas Producer Plants
Ore Bridges
Charging Machines
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Skip Hoists
Clamshell Buckets
Forging Manipulators

Wellman electric mine hoists

give dependable performance all over the world



Wellman 10' x 4' 11" Double Drum Geared Electric Mine Hoist with 7' axial plate clutch and 10' Parallel Acting Brakes. Rated rope pull: 22,000 lbs.

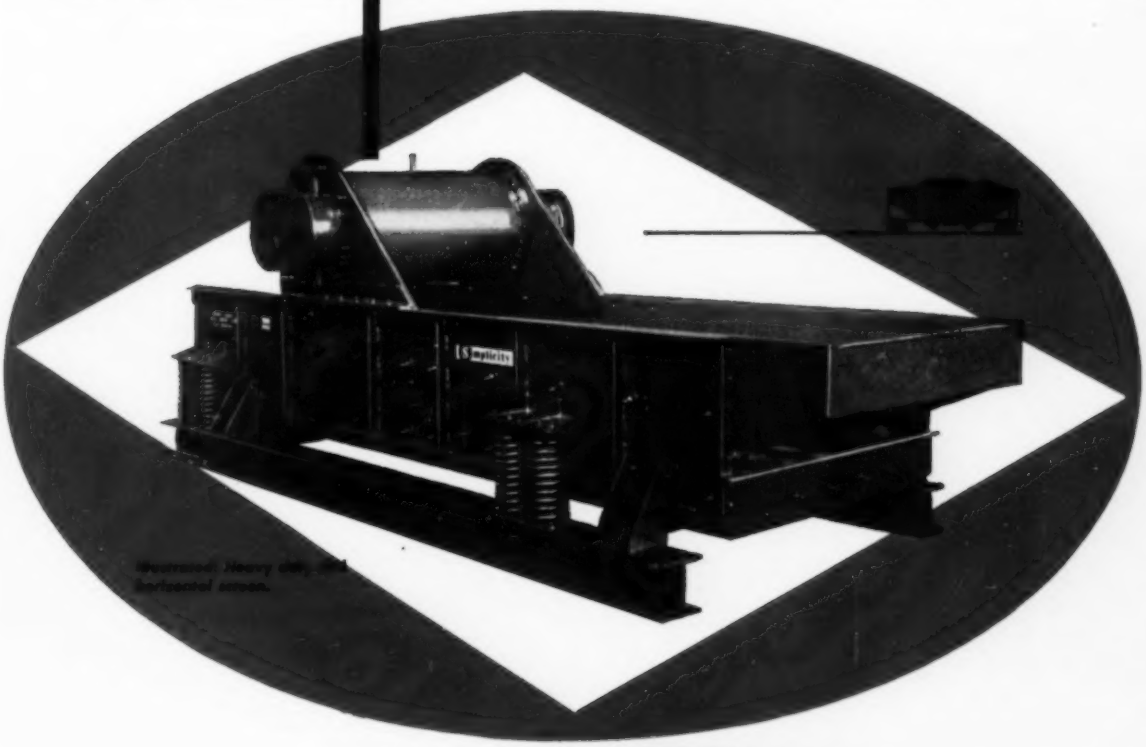
● For more than half a century, in mines all over the world, Wellman Electric Mine Hoists have been used because they combine expert design with expert construction . . . featuring all the "modern improvements" developed in our many years' experience. Wellman Mine Hoists provide maximum safety, peak economy, and trouble-free operation under a wide variety of conditions. Let us give you recommendations for hoists that will do your job most satisfactorily.

THE WELLMAN ENGINEERING COMPANY

7000 CENTRAL AVENUE • CLEVELAND 4, OHIO

SIMPLICITY SCREENS

do a fast, efficient job of sizing, separating, dewatering and dedusting coal for the mining industry



Illustrated: Heavy duty, ball tray horizontal screen.

SIMPLICITY gyrating, horizontal, simpliflo screens all have their place in the tough job of processing coal. They handle the coarse scalping, size, separate and grade coal, dewater fine coal sludge, and dedust coal in dry screening operations. Special ball tray deck models even screen damp, sticky coal through small mesh screen cloth without blinding. The unique screening actions and the heavy, powerful construction of SIMPLICITY Screens help maintain high daily production rates throughout the coal industry. All model Screens available in a wide range of sizes. For complete information, consult a SIMPLICITY sales engineer or write us today.

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Sales representatives in all parts of the U.S.A.
FOR CANADA: Canadian Bridge Engineering Co., Ltd. Walkerville, Ontario
FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

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ENGINEERING COMPANY • DURAND, MICHIGAN

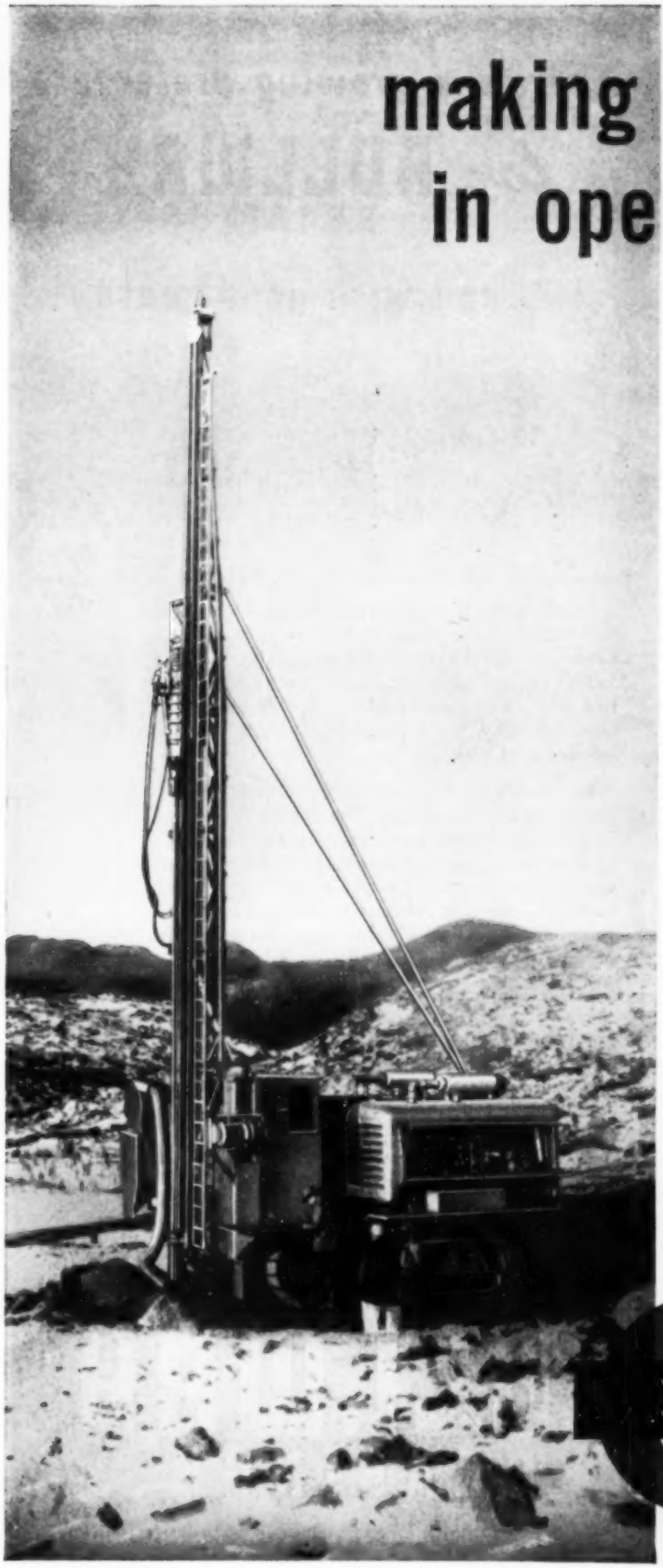
High Capacity Loader For Low Coal

(Type 865)

designed and built by **GOODMAN MANUFACTURING COMPANY CHICAGO**

Goodman builds mobile loaders of 3 heights for trackless mining. All feature free and easy side swing of loading head and discharge end that simplifies loading routine, means more productive loading time.

Goodman BUILDERS OF A COMPLETE LINE OF UNDERGROUND MINING MACHINERY



making big savings in open-pit mining

The I-R QUARRYMASTER

cuts the cost of primary blast-hole drilling in any kind of ore

HIGH drilling speed, low bit cost, minimum labor requirements, low service truck charges—these are but a few QUARRYMASTER advantages that give you the lowest possible drilling cost per ton. Fast drilling speeds mean more holes per day, permitting closer hole spacing for better fragmentation. The result is increased primary crusher efficiencies and reduced costs on loading and hauling equipment. Compare these features with any other drill rig.

- DRILL ANY KIND OF ROCK—from the softest limestones and dolomites to the hardest granites.
- REAL DRILLING SPEED—drills 25 to 60 feet per hour in limestone and 9 to 15 feet per hour in granite.
- LOWEST BIT COST—of any blast hole drilling method. Carset Bit life from 700 to 1600 feet in granite—up to 14,000 feet in soft, less abrasive formations.
- NEEDS NO BLACKSMITH SHOP—Carset Bits are easily handled and sharpened on the job. No falling off of drilling speeds because of dull bits.
- REQUIRES NO SPECIALIZED LABOR.

Ask your nearest Ingersoll-Rand representative about this completely self-contained, self-propelled outfit that drills 6-inch holes, has continuous hole cleaning, automatic rotation and is available in either diesel or electric drive.

INGERSOLL-RAND COMPANY
11 Broadway, New York 4, New York

Ingersoll-Rand
QUARRYMASTER

711-5

There's a growing preference for ROLLWAY BEARINGS

...and with good reason!

Unwavering right-line rotation—free of skew, side-shock and end-rub—greatly extends the life expectancy of a Rollway Roller Bearing. Add to longer life the definite gains in smoother operation and lower maintenance costs and it's understandable why, today, demand for Rollways has reached a new peak.

Our increased facilities are expanding Rollway output as fast as possible. We are continuing to improve the balance between supply and demand, so that service to both established and new customers will be geared to their quantity requirements . . . another reason why bearing users can confidently specify "The bearings that *roll* right because they're *made* right."

Our complete engineering and metallurgical services will gladly work with you on your problems. Simply write or wire any sales office. No cost. No obligation.

Rollway Bearing replacements are available through authorized bearing distributors in principal cities. Consult your classified 'phone directory.

ROLLWAY BEARING CO., INC.
SYRACUSE 4, N. Y.

RIGHT ANGLE

ROLLER ENDS, precisely square to avoid end-rub, oscillation and side-shock.

RIGHT ANGLE

BEARING SURFACES with parallelism that results in unwavering right-line rolling.

RIGHT ANGLE

SEPARATOR SLOTS accurately machined to prevent roller skew, slide and uneven wear.

SALES OFFICES

Syracuse	Chicago
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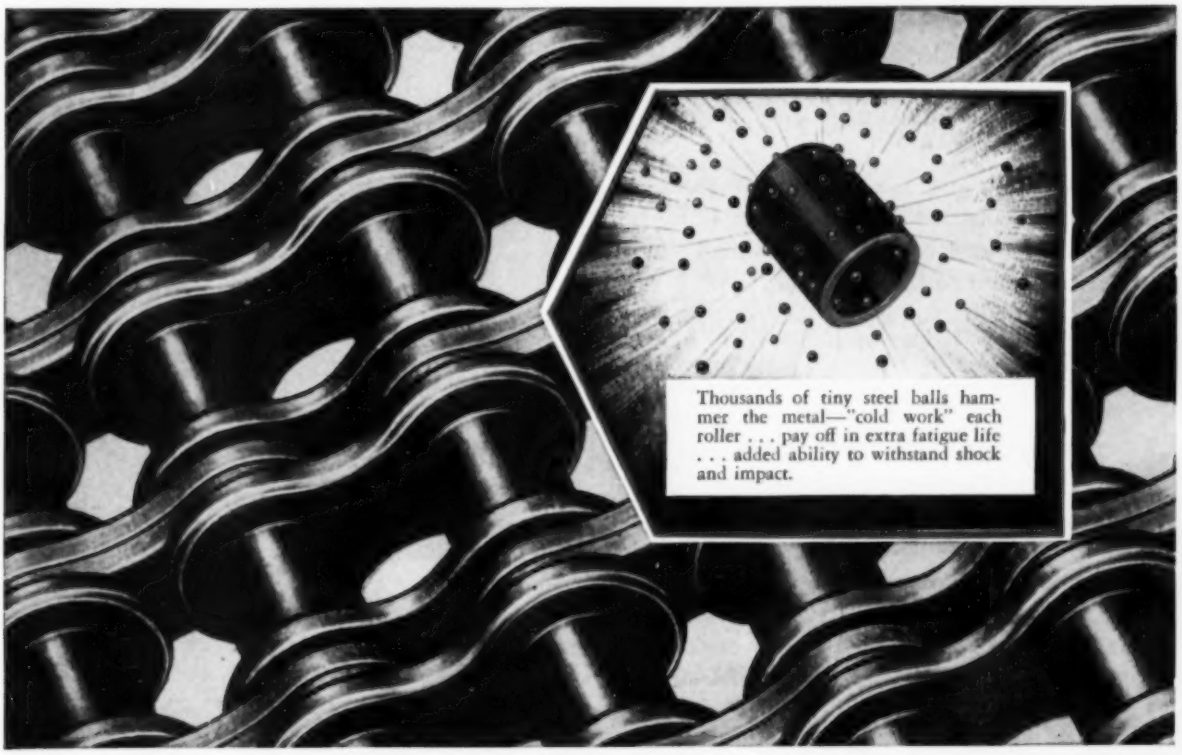
ROLLWAY BEARINGS

Complete Line of Radial and Thrust Cylindrical Roller Bearings

Get the roller chain that gives you SHOT-PEENED rollers...



look for the darkened rollers!

THERE are sound reasons for the universal acceptance of Link-Belt Precision Steel Roller Chain. Two of them—shot-peened rollers and Lock-type Bushings—are shown here.

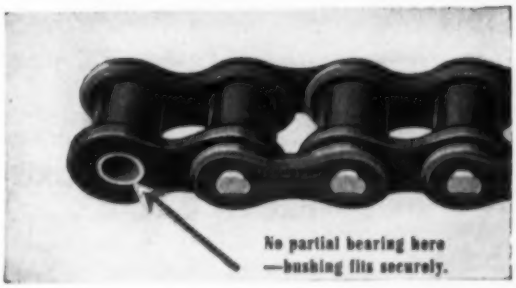
Others include Link-Belt's rigid material selection and controlled heat treating—your assurance of absolute uniformity with no weak members.

Whether it's for drive or conveyor service, you can get the best in roller chain from the complete Link-Belt line—single and multiple widths, in 3/8" through 3", and double pitch, 1" through 3". Next time you need roller chain, call the Link-Belt office near you.

LINK-BELT

PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in Principal Cities. 12,097



Lock-type Bushings increase ability to withstand shock loads

A special manufacturing process securely locks the inside sidebars on the bushing, preventing lateral movement of the sidebars and eliminating a common cause of stiff chains. This Link-Belt development is applied on roller chains through 1" pitch and double pitch roller chains through 2" pitch.

"Here's one place where it pays to be TIGHT!"

"Shooting a blast is like jumping with a parachute . . . everything's got to work right the first time, or else!

"And everything depends on the loading and hook-up. You need *tight* connections all along the line, and you get 'em quickly and easily with Primacord.

"For the trunk line, I use Plain Primacord. It ties easily in knots that don't loosen up.

"That square knot is used above ground, when you want to lengthen the trunk line.

"Just remember to *pull it up tight*. You can, with Primacord."

Ask your explosives supplier or write for further facts to

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut
Also Safety Fuse Since 1836

PLAIN PRIMACORD

is very flexible and light in weight. It has a tough textile cover and can be tied up tight without slipping. Use it as the down line in small bore or shallow holes and as the trunk line to connect all holes.

Other PRIMACORD Brands

Reinforced — for deep holes and resistance to abrasion

Wire Countered — for deep ragged holes

Plastic Reinforced — for deep holes and unusual wet conditions.

P-2

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

FEBRUARY, 1953 IVAN A. GIVEN, EDITOR

Fair or Better

A LOOK BACK at what happened to coal production in 1952 perhaps makes this a top question: "Is 1952 rock bottom or is output due for another drop?" Certainly the promises of 1952 were dissipated in bituminous by a steady decline in output that continued through June. Recovery in the last half was substantial but still not enough to bring the weekly average up to the first-half figure, though it was fairly close. In anthracite, the picture was one of running a fraction behind for the greater part of the year.

Bottlenecks in '52

What hit production in 1952? First of all, oil continued its pressure and natural gas increased its drive. In addition, anthracite, and to some extent, bituminous were again plagued by warmer-than-normal weather. Vacations and work stoppages had some effect in both industries. The biggest brake on output, however, was the steel strike and its resultant effects on other business. Diesels displaced additional coal on the railroads and overseas exports failed to come up to expectations. And to top off everything else, the coal salesman's lot was made even harder by cost increases growing out of wage and other increases won by Mr. Lewis.

How '53 Shapes Up

The net result of the interaction of all these forces was a bituminous production of 465,000,000 tons, a drop of 12.9% from the 1951 figure of 533,665,000 tons, while anthracite dropped 6.3% from 42,670,000 tons in 1951 to 39,974,000 tons last year. Commercial producers were, of course, the most affected. Is there reason to be at least mildly optimistic about 1953? Unless the booby traps are unusually well concealed, the answer is a definite "Yes," with no lengthy work stoppages and no significant business recession as the major qualifications. Competition will continue tough, overseas exports are still a question, and there will be a further decline in railroad tonnage, though at a slower rate. Both utilities and steel, however, are expected to increase consumption appreciably, and a high level of business should encourage general industrial and commercial use. With normal temperatures to help, both anthracite and bituminous stand to rack up gains of 5% or more in 1953.

Better Backing for Sales

Whatever else may be said of 1952, it was marked by real progress in backing up sales efforts with higher efficiency, quality, safety, research, advertising and better relations with labor, government and the public. New machines and new techniques, as outlined elsewhere in this issue, are paving the way to major advances in low-cost continuous-flow production in both flat and pitching coal. And progress in mining is being matched by advances in preparation and safety, as well as in research and in sales and advertising programs designed to bring coal's advantages home to present and potential purchasers.

Still Fair Ahead

The events of 1952 did nothing to change the basic fact that coal is a vigorous, fighting industry undismayed by difficulties and willing to work to hold its vital place in the American economy through better service. Not only is it vital today but it has real prospects for the future—in the production of chemicals, to name but one. Temporary setbacks do not change these prospects, nor do they wipe out the solid achievements in production, preparation, safety, research and safety that have kept coal a vital cog in the progress of the Nation. America will continue to grow, and continued stress on better methods, better equipment and better merchandising will insure that coal grows with it. Fair or better is still the forecast.

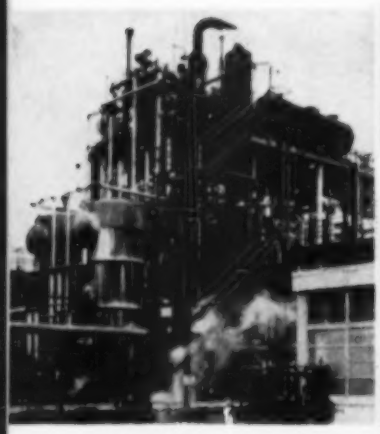
Men and Coal in '52

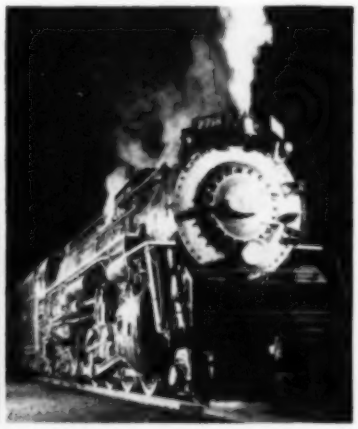
PRESIDENT EISENHOWER—His election gave hope for an end of controls, a sounder dollar and a friendlier climate for American business and industry.

JUDGE PINE—He returned the steel mills to their owners and denied President Truman's claim of "inherent powers" to seize industry's plants and facilities.

JOHN L. LEWIS—He won a wage boost that raised miners to $18.25 a day, besides other gains, and put miners far out front in the year's wage parade.

EX-PRESIDENT TRUMAN—He over-rode WSB in the coal-wage case and signed the Federal Coal Mine Safety Act, empowering federal men to close mines.





Photos: Wide World, U.S. Air Forces, Carbide & Carbon Chemicals Co.

Markets and Coal in '52

CHEMICALS—New vistas opened for coal when Carbide & Carbon Chemicals Co's. $11,000,000 pilot plant went on stream to make high-grade chemicals.

ATOMIC ENERGY—With the economics of electricity from nuclear fission dubious, new TVA and AEC steam plants promised a market for over 25,000,000 tons.

STEEL—A 54-day steel strike lost the Nation 18,000,000 tons of needed steel and cut demand for coal in steel and other coal-using plants and industries.

RAILROADS—Coal lost 15,000,000 tons as the percentage of traffic hauled by steamers dropped. But coal seemed near rockbottom in the railroad market.

Facts About Coal

	1952*	1951
BITUMINOUS		
Production, tons	465,000,000	533,664,732
Per cent stripped	23.0	22.04
Value at mine, per ton	$4.95	$4.92
Mechanically loaded underground, per cent	60.0	57.01
Mechanically cleaned, per cent	48.0	44.97
Stocks, tons	78,000,000†	82,178,891‡
ANTHRACITE		
Production, tons	39,974,000	42,669,997
Per cent stripped	26.0	26.1
Value at mine, per ton	$10.00	$9.94

Source: U. S. Bureau of Mines. *Estimated. †Oct. 31. ‡Dec. 31.

Facts About Coal's Workers

	1952	1951
BITUMINOUS		
Employees	360,600*	372,897
Average weekly earnings	$76.82*	$77.86
Peak weekly earnings	$90.62*	$86.39
Average hours per week	33.9*	35.2
Tons per man-day	7.25*	7.04
ANTHRACITE		
Employees	66,800*	68,995
Average weekly earnings	$69.90*	$66.60
Peak weekly earnings	$80.86*	$81.88
Average hours per week	31.2*	30.30
Tons per man-day	2.95†	2.97

Sources: USBM, Bureau of Labor Statistics. *Through November. †Through September.

Slack Year in '52 ... Better Times in '53

The year past showed . . .

Gains in safety, efficiency

Losses in tonnage, profits

The year ahead promises . . .

Upturn in output, earnings

Better climate in Washington

FAIR PROMISES NOT WHOLLY FULFILLED—that's coal's story for 1952.

Highlights of the year were:

1. Enactment of the Federal Coal-Mine Safety Act.

2. A new wage agreement that pushed miner's basic daily wage to $18.25 and, in the process, wrecked the Wage Stabilization Board.

3. Judge Pine's decision in the steel case, which narrowed the President's power to seize private industry.

4. Election of a Republican administration and Congress, with the prospect of a friendlier climate for businessmen.

Bituminous production at the end of the year stood at 465,000,000 tons, about 100,000,000 tons under forecasts at the start of the year and some 70,000,000 tons below 1951 output. Anthracite, with 39,974,000 tons of production, ended the year some 2,700,000 tons below the 1951 level.

Biggest tonnage loss was chargeable to the steel strike. In 54 days, this shutdown knocked out an estimated 18,000,000 tons of steel production and some 20,000,000 tons of coal for coke ovens, steel and rolling mills. With less steel pouring from the mills, other industries sagged and demand for electric power fell off, bringing a corresponding slump in coal demand.

In Western Europe, an upsurge in coal output, especially in the second half of the year, cut overseas export markets from the 46,000,000 tons predicted at the start of the year to an actual movement of about 26,000,000 tons.

The railroads bought and used more diesels in 1952. This fact, together with a decline in freight traffic growing out of the steel strike, cut locomotive-fuel needs by some 15,000,000 tons below 1951.

Finally, good hydro conditions in the Southeast, especially in the first half of the year, plus an increased volume of natural gas at "dump" rates, temporarily slowed coal's growth in electric-power generation. Instead of the 112,000,000 tons predicted at the start of the year, the utilities burned about 106,000,000 tons.

Even so, the year was not altogether lost. In fact, coal marked up measurable gains in areas other than tonnage and profits.

In bituminous, production per man-day rose to an estimated 7.25 tons, a rise of 3% over 1951. In anthracite, productivity held steady, near 2.97, in spite of increasingly difficult mining conditions in underground operations.

Safety-wise, the industry set new lows in fatalities per million tons and in major disasters. Meanwhile, at mid-year, Congress passed and the President signed the Federal Coal Mine Safety Act, aimed primarily at preventing major disasters, and the Bureau of Mines undertook administration of the law.

Though coal-company profits generally were below 1951 levels, the established organizations rode out the year without serious damage, though it was questionable how much longer the industry could stay strong on its narrow profit margin. Reflecting slack markets in 1952, data available on mines with capacity of 500 tpd or over showed that some 13 new deep mines with planned capacity totaling 19,050 tpd and 11 new strip mines with total capacity of 21,700 tpd were announced during the year. Biggest of these still were in the planning stage—a 5,000-tpd deep mine in Alabama and a 4,500-tpd strip mine in Indiana, both to serve steam-electric plants.

On the labor-relations side, though Mr. Lewis threatened a strike against the operators, when the strike came it was against the government instead, with union and operator representatives standing together to seek an end to government interference with collective bargaining. With the wage boost and with a pick-up in working time as winter moved in, weekly earning in bituminous soared in November to $86.16; in anthracite, to $80.86.

In addition to the gains listed above, coal men gained new confidence from other developments, as follows:

1. The report of the President's Materials Policy Commission (the Paley Commission), which gave coal a strong boost as the Nation's basic energy resource.

2. The emergence of the first elements of a new chemicals-from-coal industry.

3. A complex of developing economic factors, including projected new transportation methods for coal and the rising price of natural gas, that promise to restore coal's dollar-and-cents advantage over competing fuels.

4. The steady growth in coal needs for the atomic-energy program, projected to well over 25,000,000 tons by 1955 or 1956.

5. Continued expansion of the electric-utility industry, which bids fair to overtake steel as coal's biggest customer in the years ahead. (*Turn page.*)

Steel and Coal

(Coke Ovens and Steel and Rolling Mills)

	Steel Output (Tons)	Coal Needs (Tons)
1951	104,000,000	121,421,000
1952	94,000,000*	104,000,000*
1953	116,000,000†	128,000,000†

*Estimated. †Predicted.

Fuel for Electric Utilities

	1952*	1951
Coal, tons	106,000,000	105,681,953
Oil, bbl	60,400,000	63,549,175
Gas, Mcf	909,000,000	763,107,638

Source: Federal Power Commission. *Estimated.

Coal and the Railroads

	1952	1951
Locomotive Fuel		
Coal, tons	32,000,000*	47,493,621
Liquid fuel, bbl	98,070,000*	102,602,154
Locomotives on Order, Dec. 1		
Coal steamers	17	21
Diesels	748	1,719
Electric	10	2
Gas turbine	19	0

Sources: Interstate Commerce Commission, Association of American Railroads. *Estimated.

Coal's Industrial Customers

HOW DID COAL FARE with its big industrial users?

Except in steel and railroads, coal pretty well held its own.

The electric utilities took about 106,000,000 tons of coal, anthracite and bituminous, compared with 105,681,952 tons in 1951. The utilities' oil burn was down from 63,549,175 bbl in 1951 to some 60,400,000 bbl in 1952, though there was an upturn in oil use in October, following the increase in miners' wages. With monthly power generation running from 5.6 to 11.8% above 1951, the utilities made up their fuel needs with natural gas, use of which rose nearly 20% from 1951 to 1952—from 763,107,638 to about 910,000,000 Mcf.

Use of coal by cement mills dropped slightly, from about 8,500,000 tons in 1951 to an estimated 8,000,000 tons in 1952, while coal use by other industrials, reflecting the steel strike, sloped off from 97,439,000 tons in 1951 to approximately 95,000,000 tons in 1952.

In steel, coal lost some 20,000,000 tons. Use of coal by coke ovens and steel and rolling mills in 1952 totaled about 104,000,000 tons, against 121,421,000 tons in 1951.

Coal lost another 15,000,000 tons in locomotive fuel. To power steam locomotives in 1951, the rails used 47,493,621 tons; in 1952, an estimated 32,000,000 tons. These figures do not include about 7,000,000 tons for generating electric power and heating offices and stations. But if coal lost ground in the locomotive-fuel market, so did oil. The railroads' liquid-fuel burn was down from 102,602,154 bbl in 1951 to approximately 98,000,000 bbl in 1952. The change can be marked up to loss of freight traffic growing out of the steel strike and its repercussions.

With some railroads during the year reporting their operations now 100% dieselized and with the number of diesels on order in 1952 less than half of the 1951 figure, there was good reason to look for a slower rate of decline in coal's railroad market.

How Gas Grew

	1952	1951
Natural Gas		
Utility sales, M therms	49,192,000*	44,718,300
Customers:		
Residential	17,440,600†	14,742,000
Commercial	1,367,000†	1,219,000
Industrial	71,400†	58,000
Manufactured and Mixed Gas		
Utility sales, M therms	3,286,000*	3,417,200
Customers:		
Domestic	6,242,700†	8,467,000
Commercial	434,100†	543,000
Industrial	33,400†	42,000

Source: American Gas Assn. *Estimated. †End, third quarter.

Coal's Big Competitors

OIL AND GAS BOTH had a good year in 1952.

Natural gas sales by utilities rose about 8.5% from 1951—44,718,300 M therms in 1951 against an estimated 48,500,000 M therms in 1952—while sales of manufactured and mixed gas fell off from 3,417,000 M therms in 1951 to about 3,293,000 in 1952. Between the end of 1951 and the end of the third quarter of 1952, residential customers of natural gas increased from 14,742,000 to 17,440,600; commercial customers, from 1,219,000 to 1,367,000; industrial users, from 58,000 to 71,400.

But 1952 was not altogether placid for gas producers and distributors—nor for their customers, who had to bear the brunt of price increases granted by the Federal Power Commission or exacted by agencies in gas-producing states. In May, for instance, pleas for rate increases pending before FPC totaled over $137,000,000 per year, with individual petitions ranging from 10 up to 40%. The states became more jealous of their gas reserves, with the Oklahoma Corporation Commission forbidding the sale of gas in the field for less than 9.8c per 1,000 cu ft (in 1946, the minimum was 7c) and with an official of the Texas Railroad Commission warning that gas should be kept at home for the state's industrial development.

Gas circles stirred up a hornets' nest of opposition with their moves to bring gas into the United States from Canada and Mexico. Coal operators, the UMWA and the railroads joined in opposing the petition of Northwest Natural Gas Co. to import 285,000 Mcf per day of Canadian gas to serve towns in Oregon, Washington and Idaho. They also fought a joint proposal of Northwest Transmission Co., Pacific Northwest Pipeline Corp. and Panhandle Eastern Pipe Line Co. to import Canadian gas to the Northwest and to export gas through the northeastern United States to eastern Canada. At the year's end, the only breach in this line of opposition appeared when FPC authorized Montana Power Co. to import 10,000,000 Mcf per year of

How Oil Grew

	1952*	1951
Crude output, bbl.	2,284,000,000	2,244,529,000
Imports:		
Crude, bbl.	200,000,000	179,073,000
Refined products, bbl.	140,000,000	128,648,000
Exports:		
Crude, bbl.	26,000,000	28,604,000
Refined products, bbl.	130,000,000	125,924,000

Source: USBM. *Estimated.

gas from Canada for the exclusive use of Anaconda Copper Mining Co.

Elsewhere, the FPC authorized Texas Gas Transmission Corp. to increase capacity from 695,400 to 990,312 Mcf per day but denied the company the right to sell gas to Tennessee Valley Authority power plants, which the company had asked for in its original petition. On the other hand, FPC authorized Duke Power Co. to buy up to 30,000 Mcf daily, on an interruptible basis, to fuel its new Lee steam station in South Carolina. Other expansions authorized during the year were spread through the Nation, many of them in coal's front yard.

The year in oil was not without some upsets, notably a strike which, overshadowed by the steel stoppage, gradually dwindled away as regional settlements were reached.

The oil industry produced approximately 2,284,000,000 bbl in 1952 against 2,224,529,000 bbl in 1951. In the course of the year, oil men drilled about 46,000 wells against a goal of 50,000 for the year and a total of 44,516 in 1951; added 400,000 bbl of daily refining capacity for a total of 7,800,000 bbl; and added 7,000 mi of crude and products pipeline for a total of 170,000 mi.

Meanwhile, independent oil producers—that is, those without foreign holdings—complained that they were being badly hurt by floods of imported residual oil. In the first two weeks of December, the tide had risen to an average of 527,000 bbl per day, 54% above the 1951 figure. President Truman did nothing to ease the situation when, in August, he cut tariffs on Venezuelan oil some 50%.

While imports of crude and refined oil products moved up substantially in 1952, exports rose considerably less, leaving the Nation with an oil deficit (imports less exports) of about 500,000 bbl per day, against some 420,000 in 1951.

Coal and Its Workers

IN LABOR RELATIONS on the national scene, the miners' search for higher wages, complicated by roadblocks thrown up by WSB, topped the year's events.

On July 22, following the steel settlement, Mr. Lewis put Harry M. Moses, president, Bituminous Coal Operators' Association, on notice that the existing contract would terminate in 60 days. Ten days later, he sent a similar notice to Joseph E. Moody, president, Southern Coal Operators' Association.

Following private conversations, Mr. Lewis and Mr. Moses reached agreement Sept. 20, on the eve of a strike deadline. Their meeting of minds gave the miners an increase of $1.90 per day, pushing the basic daily wage up to $18.25; recognized seniority for the first time in a national agreement; added 10c per ton to the welfare-fund levy, bringing the total to 40c; made provision for "memorial periods" not to exceed 10 days a year; and undertook to close loopholes whereby some operators had run both union and non-union mines. On Sept. 30, Mr. Moody signed the same agreement on behalf of his principals. Estimates of increased costs growing out of the new contract ranged from 30 to 60c per ton. The anthracite contract, signed Nov. 1, embodied almost identical terms except for the welfare toll, which was upped 20c to a total of 50c per ton.

Everything appeared settled until WSB stepped into the act with a decision that $1.50 was enough for the miners. In protest, miners left their jobs and returned only at Mr. Lewis' request following a dramatic White House conference with the President and his aides, together with Mr. Moses. The President, on the heels of the November election, authorized the full increase of $1.90. With the wage stabilization program scuttled, WSB industry members resigned.

Winning higher wages was only one token of the union's strength in 1952. At its quadrennial convention in October, at Cincinnati, the UMWA reported $34,000,000 in its treasury and voted an $8,000,000 assessment "to replenish the treasury burdened by recent heavy disbursements and to provide for future contingencies." Earlier, in August, in a published report aimed at the approaching convention, the UMWA Welfare Fund reported disbursements of $126,504,522 for 257,949 beneficiaries and a balance of $99,505,895 at the end of the fiscal year. Later, in September, trustees announced that the fund had paid its millionth hospital and doctor bill. The convention itself voted resolutions asking Congress to stabilize coal and extend the Federal Coal Mine Safety Act to mines employing fewer than 15 men.

Union affairs, however, were not all sweetness and light and brotherly love. In January, 1,200 miners in West Virginia, asking the right to elect their own district officials, called a brief strike—not against their companies but against district officials and their policies. Later, in August, a Pennsylvania anthracite local asked publicly for "a say in its own affairs." Elsewhere, in Virginia, the UMWA made out-of-court settlements on suits seeking over $1,000,000 for violence and property damage in Wise County.

On the whole, though, peace reigned on the labor front, with only a few scattered upheavals growing out of organizing drives or out of discharges of men who refused to follow foremen's orders or accept reassignments. The comparative quiet doubtless was the result of continuing efforts by management to win the friendship and confidence of workers.

Spurred by the need to recruit skilled men for an industry that is mechanizing itself at top speed, coal leaders sought new ways to provide a reservoir of highly trained young men. Leading the parade was the Education and Vocational Training Committee of the National Coal Association. During 1952, the committee met at Lafayette University, Virginia Polytechnic Institute and Pennsylvania State College, interviewing students in mining engineering, reviewing engineering curricula with administrators and faculty and offering suggestions and help to make mining engineering a more alluring and practical course of study. Old scholarships were renewed and new ones were established to advance the cause of the industry.

Indirectly if not directly because of interest shown by NCA's committee and individual operators, mining students from Lehigh University visited coal operations in Pennsylvania and students from the University of Minnesota toured Illinois mines in September. On the high-school level, meanwhile, 180 boys toured Inland Steel Co's. mine at Wheelwright, Ky., in July. (*Turn page.*)

Safety in Mining

A NEW RECORD LOW in the fatality rate per million tons of bituminous mined (p 81) and enactment of the Federal Coal Mine Safety Act were high spots of the year in safety.

The Senate Labor Committee opened hearings on proposed mine-safety legislation Jan. 24, within little over a month after the Orient No. 2 explosion. A House committee began its hearings Feb. 18. Though many coal operators, individually and collectively, opposed extension of federal powers into mine safety, a strong and influential group, persuaded that federal legislation was inevitable, undertook to write an acceptable bill. UMWA and USBM representatives joined in the effort. The result was the McConnell bill, which Congress voted into law July 2 and President Truman signed July 17.

Aimed primarily at preventing major disasters, the law vested federal inspectors with authority to close mines or sections of mines found unsafe, provided for close cooperation between federal and state inspectors and wrote the Federal Mine Safety Code into law, thus denying the USBM the right to make arbitrary rules and regulations. The USBM moved cautiously into administration of the law.

Locally, individual companies continued to set and celebrate new safety records. To mention only a few, Elk River Coal & Lumber Co. in February completed 5 yr of operations and the mining of 4,200,000 tons without a fatality; Kentucky Cardinal Coal Co. in May completed 22 yr and the mining of 2,000,000 tons without a fatality and 2½ yr, with 169,000 tons, without a lost-time injury; and Island Creek Coal Co., also in May, wound up 2½ yr without a fatality in operations that included 11 mines, 11,000,000 tons and 4,300 employees.

Coal and the Government

WASHINGTON PLAYED A STRONG HAND, as usual, in the year's events affecting coal.

Federal Judge David A. Pine late in April ruled in the steel case that the President has no "inherent powers" to seize private industry. Coal men, who through the years have suffered more than any other group by federal seizure, felt they could breathe a little easier because of Judge Pine's decision.

Earlier in the year, coal and allied interests began their fight against the railroads' petition for higher freight rates. But they fought mostly in vain. In April, the Interstate Commerce Commission granted the last instalment on requested freight-rate increases totaling 15% over April 3, 1951. Solid fuels won only a slight concession—rate boosts were limited to 12%, with a maximum of 40c per net ton, on coal and coke, and to 6%, with a maximum of 20c, on lignite. The ICC grant was the twelfth freight-rate rise since the end of World War II.

Giving substance to warnings by coal men that railroads soon might run into the law of diminishing returns, at least three groups pressed for new ways to move coal to market. At Georgetown, Ohio, and Library, Pa., Pittsburgh Consolidation Coal Co. added momentum to its research in pipeline transportation. As the year drew toward an end, coal and steel interests announced formation of Hydro Coal Transportation Co., Youngstown, Ohio. The new company, awaiting further results from studies at Georgetown and Library, hopes to build a 30-mi pipeline to move coal slurry from unloading points on the Ohio River to Youngstown. Meanwhile, Riverlake Belt Conveyor Lines Co., sponsors of the 103-mi overland belt conveyor for coal and ore, first proposed in 1950, amended and renewed its original petition for right of eminent domain, moving the proposed northern terminus to Cleveland.

Federal controls had little or no effect on coal. Generally, with coal selling well below ceilings, removal of price controls on coal was an academic issue. Except for fears that a strike might break out over wages, OPS might have lifted coal-price controls altogether. For most of the year, steel, copper and other supplies were in adequate supply for coal's needs.

Coal and Home Heat

	1952*	1951
Bituminous		
Retail dealer deliveries, tons	73,000,000	76,531,000
Anthracite		
Production	39,974,000	42,669,997
Heating Equipment, Shipments		
Stokers, Classes I and II	18,100	18,944
Residential oil burners and units	715,000	661,251
Warm-air gas furnaces	429,000	392,871

Sources: USBM, Dept. of Commerce. *Estimated.

Winning the Public to Coal

MAKING NEW FRIENDS was the aim of much of coal's activity in 1952.

Bituminous Coal Institute in February launched "The Genie Story," a 16-page booklet using the comic-strip technique, to catch the attention of youngsters. BCI's new color film, "Powering America's Progress," telling coal's story from mine to market, received wide television bookings across the Nation. In December, BCI's Speakers' Bureau announced 104 bookings for the 1952-53 season—28 more than at the same date in 1952. And BCI's Educational Division, besides arranging coal exhibits at educational, professional and industrial conventions, dispatched up to a dozen mailsacks per day of literature in response to requests from teachers and students.

As for individual companies, they also did their share. To mention only a few, West Kentucky Coal Co. in March published a handsome color booklet bearing the title, "Enjoying Life: West Kentucky Coal Co.'s Share in the American Way of Living," and distributed it among its neighbors, friends, customers and prospects. Mostly, the booklet boosted Western Kentucky as a good place to live and work. Sinclair Coal Co. likewise recognized and promoted local interest and pride by publishing a bi-weekly series of advertisements in newspapers serving towns near the company's mines. The advertisements carried a schedule of upcoming local events.

If these were indirect merchandising techniques, NCA's Coal Heating Service Div. and its retailer and association affiliates exploited the direct merchandising approach. In January, CHS announced eight new local groups organized under Plan 3. Later in the year, CHS launched its Commercial and Small Industrial Plant Modernization Program in three Midwest cities—Dayton, Milwaukee and

Minneapolis-St. Paul. At the end of the year, CHS announced that the program had averted several switchovers to oil.

Later in the year, CHS joined Iron Fireman Mfg. Co. and U. S. Machine Corp. in a two-day training program for coal and equipment salesmen to acquaint them with heating fundamentals and equipment features.

In anthracite, the Anthracite Institute continued its program of advertising and promotion in the industry's market areas. It also sent its traveling exhibit, showing modern burning equipment actually fired up, to several cities and to homeowners', builders' and architects' shows and launched a new open-front fireplace grate, the Anthrahearth, for home use.

Looking to the Future

RESEARCH MORE THAN EVER BEFORE appeared to be the key to coal's future.

Coal companies by no means carried the burden alone. Moving individually and collectively, they were joined by allied interests—electric utilities, railroads, the chemicals industry, the USBM and various state research agencies. The big lack was money to support research.

Seeking to remedy the money defect, BCR at its annual meeting in February approved a blueprint for expanded research to get underway as soon as 150,000,000 tons of coal production signed up for additional subscriptions. At the year's end, BCR was able to report substantial progress, with over 35 coal, coal-land and railroad companies underwriting the new program. The organization also announced plans for leasing a building at Columbus, Ohio, to house a staff and facilities for design, development and testing of equipment and processes.

As for accomplishments in 1952, the coal-fired gas-turbine locomotive moved closer to an on-the-rails test; the BCR continuous miner, now well developed, was sold to an equipment manufacturer; a new furnace-stoker for tobacco curing was developed; home-heating equipment was improved; and booklets on flyash and smoke control as well as firing methods were published as aids to industry.

The USBM meanwhile pressed its researches into coal reserves, mining methods, utilization, liquefaction, gasification and safety. Release of the Bureau's estimated cost data on making synthetic liquid fuels in 1951 had stirred a controversy with oil and other circles that carried over into 1952, when revised data compiled by a private engineering firm, indicating that oil could be made economically from coal, came under attack from the same quarters. At the year's end, a study laying greater stress on chemicals from coal appeared to reflect some modification of the Bureau's approach. Earlier, a top Bureau official, commenting on the technology of synthetic liquid fuels, reported "a staggering amount of work" yet to be done.

On the chemicals front, coal stood at the threshold of a new era. Pittsburgh Consolidation Coal Co. made long strides in its pilot-plant research in coal carbonization and chemicals-from-coal. Elsewhere, The Koppers Co. in January set up a fuels-processing division within its research department to investigate carbonization, hydrogenation and gasification. In May, Carbide & Carbon Chemicals Co., a subsidiary of Union Carbide & Carbon Co., put its $11,000,000 pilot plant on stream to make aromatic chemicals from coal, the result of nearly two decades of research. How much coal the chemicals industry would require remained an open question.

Though opportunities looked good in the chemicals industry for the long-range future, coal's closest-range big promise lay in the electric utilities. Installed utility and industrial capacity at the end of October totaled over 93,000,000 kw, an increase of some 6% over 1951. Power generation was running about 7% above 1951. Between now and 1956, 42,000,000 kw of new capacity is planned. On the whole, utility spokesmen as well as the Paley Commission agreed that coal must be the Nation's basic source of electric energy in the years ahead. At the end of the year, the Reclamation Bureau came out publicly with a long-range proposal for an electric-power grid made up of a number of 1,500,000- to 2,000,000-kw coal-fired steam stations in the Great Plains and Rocky Mountain regions. The grid, which conceivably could be completed by 1975, would be designed to transmit power at 500,000 v over distances of 600 mi or more.

With these prospects in view, coal men had little need to fret about atomic energy as a substitute for coal. At best, central-station generation of electricity from nuclear fission appeared decades away—on a competitive basis, that is. Meanwhile, the atomic-energy program bids fair to boost rather than displace coal. Power plants now being built in Ohio and Indiana to provide energy for the Atomic Energy Commission's new gaseous diffusion plant near by will require up to 8,000,000 tons of coal per year. And by 1955, additions to steam capacity of TVA, mostly for AEC, will require 15,000,000 tons per year, with a potential of up to 18,000,000 tons.

Looking Ahead in '53

WHAT DOES 1953 LOOK LIKE?

In general terms, the crystal-ball department sees 1953 as a strong year, with business and industrial activity carrying over at a high level from 1952 through 1953.

In fact, much that's good can come to coal men without their lifting a hand. Uninterrupted steel output, for instance, easily could restore what coal lost in this market in 1952, not to mention the coal needs of new steel capacity to be added in 1953. Likewise, a year of labor peace can spur coal's utility business, which sagged noticeably in September and October of 1952. New utility capacity brought in toward the close of 1952 and scheduled for 1953 will brighten the outlook further—if price is right.

But coal men will not rest on their oars if past performance is a guide to future conduct. With effective cost-cutting, realistic merchandising and substantial investment in research and the products of research, 1953 can be made a good year.

Here's how the year ahead looks:

	Bituminous Demand in 1953 (Tons)
Electric utilities	120,000,000
Coke ovens, steel and rolling mills	128,000,000
Cement mills	8,500,000
Railroads (all uses)	32,000,000
Other industrials	100,000,000
Retailer deliveries	70,000,000
Exports:	
Canada	23,500,000
Overseas and bunker	18,000,000
Total	500,000,000

Granted normal winter temperatures in its market area, the anthracite industry should produce 40,000,000 tons or more.

MINING FROM THE SURFACE without men going underground received new impetus from a remotely controlled machine capable of mining up to 1,000 to 1,500 ft.

HIGHER-CAPACITY EQUIPMENT for deeper overburden and higher yardage rates was supplemented by increased stress on bank preparation and other stripping services.

Mining Progress in 1952

Underground Stripping Preparation

Deep Mining

A LONG STEP toward highly mechanized continuous-flow production marked coal-mining developments in 1952. In addition to a substantial increase in continuous-mining units in service, there was another rise in longwalling and in longhole drilling and shooting in pitching coal. Augering underground also progressed in 1952. Both longholing and augering are forms of remote mining in which substantial production is achieved without men at the face or—as with most augers—even underground. Both also provide high tonnages per man though the distances they can go so far are normally less than 200 ft.

The distance over which remote mining can be done was materially increased by a new underground unit unveiled late in the year (*Coal Age*, December, 1952). To date the machine has mined 690 ft from the outcrop, and the designers feel that it can easily go 1,000 or 1,500 ft, making a cut 9 ft 8 in wide and 38 in high and producing, in its present location, at rates up to 567 tons per shift, 1,240 tons per day of three shifts, and 6,000 tons per 7-day week, with 37 on the payroll, including direct supervision. The grapevine had it at the end of the year that other machines designed to achieve similar results were under development.

So far, the remote miner operates from the surface, as also do most of the augers. However, the miner can be redesigned to work underground, while several experimental underground auger installations saw service in 1952.

PITCH AND LONGWALL

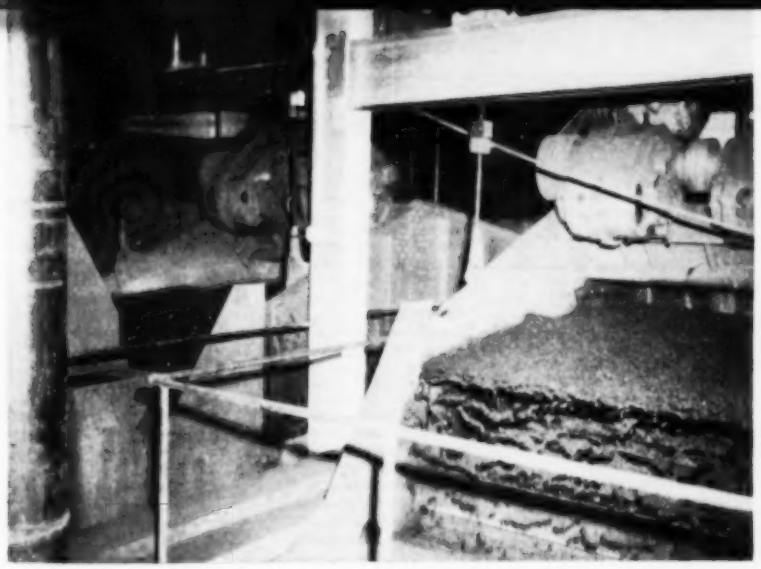
Longhole drilling and shooting in pitching beds is a form of remote mining designed primarily for underground openings. Though production is not yet large, there was an increase in longholing in anthracite in 1952. Most projects, however, were still experimental in nature, but indications were that longholing would become a significant factor in the not-too-distant future. Some thought also was given to big augers in pitching coal, as well as to the longwall-type units, such as, the coal planer mining long faces up and down or at an angle across the pitch.

Trials of longwall machines developed in Germany and Great Britain were providing favorable showings in 1952 in the bituminous fields, with the result that a number of additional units were being arranged for. These trials indicated that roof control is not a bar to longwalling in the United States. One 270-ft stripper operation was providing an average of 18 tpm in 38- to 42-in coal with a crew averaging 10½ men per shift. A planer in coal averaging 34 in provided 12.3 tons of clean coal per man in developing and mining an initial block on a 328-ft face, compared to 10.4 tpm by conventional methods. Substantially similar improvements were being registered by a cutter-loader installation.

MINER USE RISES

A substantial increase in conventional-type continuous miners marked production developments in deep mines in 1952, while the use of standard loading machines showed another rise. The leading miner users were getting such results as 46 tons per crew man in 4- to 5-ft coal. Over this particular operation, tons per man all men on the payroll averaged 8.65 in the early months of 1952, against 5.09 in 1949, the last year of operation with conventional loading equipment.

The number of continuous miners and loading machines sold in 1952 (p 83 of this issue), totaled 206,



FINE-COAL CLEANING, screening and drying moved farther to the front of the stage in preparation, which was also marked by another growth in the use of heavy-media equipment and greater stress on maintenance of plants.

against 287 in 1951 and 723 loaders in the peak year of 1948. A sizable fraction of loader sales last year represented new-type units for use in very thin coal, say less than 36 or 40 in. Sales of room and face conveyors also declined to 278 in 1952, against 450 in 1951 and 1,583 in 1948, the peak year. A substantial fraction of the conveyor sales represented installations growing out of the development of bridge, cascade and articulated conveyors for use behind loading machines and miners. Reflecting growing use of loading machines, full-seam mining rose substantially in the past year.

FACE PREPARATION

Hydraulic drilling registered another substantial gain in face preparation in 1952, with emphasis on both large mounted units and on the smaller hand-held units powered from other face units with hydraulic systems. Hand-held units powered from cutting machines by flexible shafts also were installed in increasing numbers. The year also saw the introduction of a hydraulic trailer for a shortwall truck to permit the use of the hand-held hydraulic drill, with a direct saving in the first installation of 10 to 15c per ton in drilling expense.

Greater attention to increasing realization by reducing the output of fines in conventional mining was marked, among other things, by an increase in air breaking. Cutting was characterized by growing use of mounted machines, with the trend heavily toward rubber-tired equipment, and by increased use of shortwalls with hydraulic control of certain operations. Special bits—alloy, carbide-tipped or tungsten-carbide-insert—were again used in increasing numbers.

ROOF SUPPORT

Bolting continued to make wide gains at the face and elsewhere in 1952, with excellent results reported from an increasing number of installations where unusually difficult top made other types of support extremely costly or unsure from the standpoint of protection. With additional experience, additional mines went to bolting in the face cycle, and bolting showed more and more that it could improve efficiency at the face in addition to providing a sizable saving in actual support cost—labor and materials—at a growing number of mines.

Rotary drilling for bolting registered additional gains, with considerable progress being made in dust collection, though search for better methods was still under way. Improved compressors also were made available in 1952 in both the portable and stationary types. Wedge-type bolts continued in favor where percussion drilling is necessary, with the expansion type showing gains with auger drilling.

Nonbolting developments in 1952 included increased use of plastic or asphalt-base compounds to prevent trouble where the roof is susceptible to attack by air or moisture. Considerable thought was devoted to preventing fire or explosion during application and to retard fire after application.

In the realm of conventional support, one operator reported that good results were being achieved with difficult top by using concrete-block arches in permanent openings. No failures have occurred in 5 yr, and the shape of the arch, following the natural shape of the roof after caving, reduces the need for lagging. The block arches, it was reported, are no more expensive than conventional support.

In the anthracite region, operators were finding it economical to support main haulage roads through pillar sections on rock-filled cribs and crossbars. The cribs are set into the ribs and in many instances the coal removed helps pay the cost of support. Furthermore, when the cribs take the load, there is no retimbering cost and haulage height is maintained without additional brushing. One anthracite company also was experimenting with German steel props as an aid to removing large pillars where surface subsidence is not permitted. After robbing, the pillared areas will be backfilled.

TRANSPORTATION

Transportation progress in 1952, both in the working sections and on the main line, included the following:

1. Wider use of shuttle cars, with more emphasis on four-wheel drive and steer types. The four-wheel drive also increases tire life. Water filling and use of extra-heavy butyl tubes also contributed to tire life in 1952.

2. Growing use of prefabricated track for on-track loading setups.

3. On-track shuttle cars pulled by locomotives passed their trial in at least one operation where thin coal and other conditions prevented big cars in working sections.

4. Bridge conveyors, cascade conveyors, articulated conveyors and pickup loader-shuttle-car setups for serving both conventional loading equipment and continuous miners showed substantial gains in 1952 through providing more-continuous transportation and thus increasing efficiency.

5. More slope belts were installed in line with the tendency to use such belts wherever possible. Mainline installations also grew. Suspension idlers for belts were being tried. Four bearings are eliminated and alignment of belts is reported to be better and easier. Hydraulic couplings between motor and reducer were installed to reduce shock, and enabled one operator to employ a lower-cost belt in a slope.

6. The number of big cars increased in 1952, along with automatic couplers, antifriction bearings, steel wheels, block signals, electric switchthrowers

and other haulage adjuncts, including mechanical track cleaners. The trend to bigger power units was marked, among other things, by major success with a three-unit locomotive at one southern operation. Additional capacity with fewer haulage crews were among the results.

SERVICE AND SAFETY

With continuous mining increasing and loads growing as a result of more mechanical mining with higher-capacity equipment, power and maintenance took on added importance in 1952. DC developments included wider use of selenium rectifiers in ratings corresponding to the ratings of earlier conversion equipment. In addition, glass-mercury rectifiers were scheduled for trial in two mining operations.

Further satisfactory results were reported with the inverted trolley, and DC distribution also was marked by wider use of improved junction boxes, sectionalization, ground protection, self-supporting power cables, and new trailing cables designed to trip the breaker with any fault in the insulation around the positive conductor.

AC showed another gain for mine service. Further consideration was given to AC systems with selenium rectifiers for supplying shuttle cars. Also, at least one AC operation used intermediate transformers to provide three-voltage power and reduced losses in distribution to the face.

Lightweight plastic and aluminum pipe for general drainage and for boreholes and other uses made additional gains in 1952, along with the use of quick couplings for metal pipe. New inserts for one metallic coupling made it applicable to plastic pipe, and an additional hinged coupling with a snap-action closing device was announced to permit joining metal and other pipe without bolts. Asbestos-cement and special alloys continued to grow where corrosion is a problem, along with rubber, alloys and special materials for pumps.

Vertical deepwell turbine pumps again increased in 1952, particularly for major dewatering applications. Automatic controls for all types of pumps were more widely applied.

In ventilation, coating to render stoppings airproof was the subject of increasing interest, along with plastic sheeting for temporary stoppings.

Communication developments included wider use of "radio" underground, with one unit featuring battery power so that communication can be continued even if trolley power is off. There was a major increase in loud-speaker systems in preparation plants and other surface facilities, and two-way radio equipment between offices and cars was installed by several deep-mining companies.

Extra complete sections to which crews can be moved while equipment in the regular section is overhauled was one underground maintenance development in 1952. There was a substantial increase in the number of underground shops. Along with this, there was an increased tendency —at least on the part of the smaller companies—to send expensive maintenance jobs to outside shops. Additions to these outside facilities included complete belt-service shops. Power tools for mine use showed a major increase, along with hard-facing of wearing parts and areas. Travel by maintenance men and supervisors was further facilitated by a substantial increase in jeeps and scooters.

Lubrication received increased emphasis, which was reflected, among other things, in a further rise in automatic centralized systems for such equipment as loaders and cutters. Plastic coatings, such as liquid neoprene, available in several colors, gained tremendously in corrosion prevention, wear-prevention and moistureproofing with such equipment as belts and electrical insulations.

Greater stress on accident-prevention education and training was a major element in safety work in 1952, which also saw greater emphasis on rockdusting and dust control. Roof-bolting again made a major contribution to safety, and transportation was the subject of greater concentration. Emphasis also was placed on fire protection, with special attention to preventing belt fires.

Prefabricated steel buildings increased substantially for portal buildings, shops, substations, offices, bath houses, and lamp and supply houses.

New Bituminous Preparation Facilities in 1952*

Coal Company	Plant Location	Capacity, TPH	Preparation Equipment
Bell & Zeller Coal & Mining Co.	Herrin, Ill. (3)	30	Deister Concentrator[1]
Bellingham Coal Mines, Inc.	Bellingham, Wash.	80	Western Machinery[2]
	Bellingham, Wash (2)	20	Deister Concentrator[1]
Berwind-White Coal Mining Co.	Wilmore, Pa. (3)	160	Fairmont[3]
	Wilmore, Pa.	360	Roberts & Schaefer[4]
Bethlehem Collieries Corp.	Ellsworth, Pa. (2)	20	Deister Concentrator[1]
Bowman Coal Co.	Saltsburg, Pa.	125	Jeffrey[5]
Campbell Brown Co.	Huntington, W. Va.	20	Deister Concentrator[1]
Carrs Fork Coal Co.	Allock, Ky.	85	Roberts & Schaefer[6]
Chicago, Wilmington & Franklin Coal Co.	Waltonville, Ill.	50	Roberts & Schaefer[4]
Clean Coal Co.	Bellaire, Ohio	250	Jeffrey
Consolidation Coal Co. (W. Va.)	Stringer, W. Va. (16)	160	Deister Concentrator[1]
Crozer Coal & Land Co.	Lynco, W. Va.	...	Kanawha[7]
Dawson Collieries Co.	Dawson Springs, Ky. (2)	20	Deister Concentrator[1]
	Dawson Springs, Ky. (2)	...	Deister Concentrator[1]
Dawson Daylight Coal Co.	Dawson Springs, Ky. (3)	...	Deister Concentrator[1]
Eastern Gas & Fuel Associates	Keystone, W. Va.	220	Roberts & Schaefer[6]
	Wharton, W. Va.	550	Kanawha[8]
Ebensburg Coal Co.	Colver, Pa.	140	Roberts & Schaefer[4]
Greensburg-Connellsville Coal & Coke Co.	Versailles, Pa.	250	Roberts & Schaefer[11]
Healy River Coal	Suntrana, Alaska	...	Link-Belt[12]
Hellier Coal & Coke Co.	Hellier, Ky.	250	Haworth[13] Wilmot[13]
Imperial Coal Corp.	Coalport, Pa.	50	Roberts & Schaefer[4]
Island Creek Coal Co.	Scarlet Glen, W. Va.	75	Roberts & Schaefer[14]
Jamison Coal & Coke Co.	Farmington, W. Va. (4)	130	Peterson[15]
Johnstown Coal & Coke Co.	Beaverdale, Pa.	100	Roberts & Schaefer[4]
Kaiser Steel Corp.	Sunnyside, Utah	650	McNally Pittsburg[16] Elmco[16] Link-Belt[16]
Lynnville Coal Co.	Lynnville, Ind. (3)	500	McNally Pittsburg[17]
	Lynnville, Ind. (15)	150	Deister Concentrator[1]
Maumee Collieries Co.	Linton, Ind. (3)	175	Robt. Holmes[18]
Mathies Coal Co.	Monongahela, Pa. (26)	280	Fairmont[19] Deister Concentrator[19]
Mays Coal Co.	Clarion, Pa.	125	Jeffrey[20]
C. H. Mead Coal Co.	East Gulf, W. Va.	...	Kanawha[21]
Midwest Utilities Coal Corp.	Sparta, Ill. (3)	250	McNally Pittsburg[22]
New Black Diamond Coal Co.	Marion, Ill. (2)	30	Deister Concentrator[1]
New River Co.	Lochgelly, W. Va.	...	Kanawha[21]
	Summerlee, W. Va.	...	Kanawha[21]
Oglebay, Norton & Co.	St. Clairsville, Ohio	70	Robt. Holmes[18]
Olga Coal Co.	Coalwood, W. Va.	1,250	Nelson L. Davis[23]
Page Coal & Coke Co.	Pageton, W. Va. (2)	232	Jeffrey
Paradise Collieries, Inc.	Paradise, Ky. (4)	650	McNally Pittsburg[24]
Pardee & Curtin Lumber Co.	Bergoo, W. Va.	120	Roberts & Schaefer[4]
Peters Creek Coal Co.	Summersville, W. Va.	50	Roberts & Schaefer[4]
Pittsburgh Coal Co.	Renton, Pa.	250	McNally Pittsburg[25]
	Renton, Pa. (2)	20	Deister Concentrator[1]

New Bituminous Preparation Facilities in 1952*

Coal Company	Plant Location	Capacity TPH	Preparation Equipment
Pocahontas Fuel Co.	Amonate, Va.	290	Fairmont[26] Link-Belt[26]
Powhatan Mining Co.	Aults, Ohio	500	Kanawha[27]
Reitz Coal Co.	Central City, Pa. (3)	100	Fairmont[21]
	Windber, Pa.	160	Roberts & Schaefer[4]
Republic Steel Co.	Sayreton, Ala. (16)	160	Deister Concentrator[1]
Ridgewood Coal Co.	Peach Creek, W. Va.	30	Fairmont[21]
Rosedale Coal Co.	Van Voorhis, W. Va.	120	Roberts & Schaefer[4]
Rochester & Pittsburgh Coal Co.	Ernest, Pa. (5)	50	McNally Pittsburg[25]
Slab Fork Coal Co.	Slab Fork, W. Va. (2)	30	McNally Pittsburg[25]
Stephens Elkhorn Fuel Co.	Manton, Ky.	150	Jeffrey[20]
Stonega Coke & Coal Co.	Appalachia, Va. (4)	40	Deister Concentrator[1]
Sycamore Coal Co.	Cinderella, W. Va.	200	Jeffrey[11]
State of Tennessee	Petros, Tenn.	200	Haworth
United Electric Coal Cos.	Canton, Ill.	1,000	Nelson L. Davis[20]
	Chicago, Ill.	60	Roberts & Schaefer[21]
U. S. Steel Co. (Robena)	Greensboro, Pa.	300	Link-Belt[22]
	Greensboro, Pa. (24)	240	Deister Concentrator[1]
Valley Camp Coal Co.	Elm Grove, W. Va.	160	Jeffrey[5]
	Shrewsbury, W. Va.	300	Kanawha[33]
West Gulf Coal Co.	Maben, W. Va.	...	Kanawha[21]
Westmoreland Mining Co.	Hampton Mines, W. Va. (2)	100	Robt. Holmes[14]
Wheeling Steel Co.	Harmarsville, Pa.	15	Eimco[34]
Woodward Iron Co.	Woodward, Ala.	25	Peterson[15]

*Includes contracts for installation of new separation equipment in existing structures. Where more than one equipment unit was installed, the number, when known, appears in parentheses following the plant address.

1. No. 7 SuperDuty Diagonal-Deck tables with Concenco revolving feed distributors as follows: Bell & Zoller, 1; Dawson Collieries, 1; Dawson Daylight, 1; Lynnville, 4; Pittsburgh Coal, 1; Republic Steel, 2; U. S. Steel, 5, plus Concenco SuperSorters 2. Wemco Mobil Mill with drum separator. 3. Chance cone, Dorr thickener and Bird polisher. 4. R&S Super Airflow equipment. 5. Unit washery.

6. Including R&S Hydroseparator equipment. 7. Including vibrating, screening and conveying equipment. 8. Leahy screens with FlexElex cloth-heating equipment. 9. Fine-coal plant, including Pangborn dust collectors. 10. ROM coal-handling plant including two car shakers, Weightometer, crusher, hopper and conveying equipment.

11. Including Jeffrey Baum-jig equipment. 12. Screening and crushing equipment, through Mines Engineering. 13. Including Wilmot-Daniels heavy-density cleaner; construction by Haworth. 14. Fine-coal plant, including Hydrotator classifier, Bird filter and Raymond flash drier. 15. Peterson TFR filters.

16. Including McNally-Norton automatic washer, two Eimco vacuum filters, Link-Belt mine-car dumper. 17. Including McNally-Norton automatic washers and McNally-Vissac downdraft drier. 18. Baughman Verti Vane thermal driers. 19. Complete fine-coal plant. 20. Diaphragm-jig equipment.

21. CMI Type E drying equipment. 22. Including McNally-Norton washers and McNally-Carpenter centrifuge. 23. Complete plant including Neldco dense-media cleaner. 24. Including McNally-Norton automatic washer and McNally-Rheo launders. 25. McNally-Norton automatic washing equipment.

26. Including Deister tables, four Multi-Louvre driers, Bird filters and Link-Belt car shaker. 27. River-loading plant. 28. Including McNally-Pulso fine-coal drier and SuperDuty Diagonal-Deck tables. 29. Including McNally-Brusset vacuum jig and McNally-Carpenter centrifuge. 30. Plant reconstruction, including Neldco dense-media unit, Bradford breaker and Deister tables.

31. Hydrotator equipment. 32. Link-Belt float-sink concentrator, through Allen & Garcia. 33. Complete plant, including 1,000-ton Armco storage bin, 200-ton Armco rock bin, Jeffrey Baum jig, 12,000-ton ground storage and river-loading tipple. 34. Eimco vacuum filter.

Stripping

MORE POWER and higher capacity to conserve manpower, handle deeper and harder overburden, and compensate for greater distances marked 1952 stripping developments. Contour stripping continued at a high level in bituminous and anthracite turned more and more to deep open-cut work with spoil haulage.

OVERBURDEN PREPARATION

With deeper overburden and more hard material, drilling and shooting were stressed in 1952. There was a noticeable shift to vertical drilling with pneumatic hole cleaning, though horizontal drilling developments included construction of a large side-wall unit with a vertical range of 5½ ft and an arc of 75 deg—all hydraulic.

One new vertical dry-type drill saw service in 1952. Results included replacement of three older vertical units and one horizontal machine, a saving of 100 lb of explosive per hole because of better cuttings for stemming, and higher yardage through better breakage.

STRIPPING AND LOADING

The big walking dragline solidified its position with additional installations in 1952. Gains also were made by higher-capacity shovels, which saw service in new fields—for example, a 30-yd machine in eastern Kentucky. Additional power and capacity were built into the smaller units—up to 10 yd for two-crawler shovels and up to 8 yd for similar draglines.

With the growth in deep open-cut stripping in anthracite there was a further increase in shovel size as well as in spoil haulage. Benching and backfilling became increasingly popular as depths went to 500 ft or more. The high-capacity dump truck was preferred for use in spoil haulage.

Scrapers and bulldozers continued to handle a big part of the stripping job at a number of bituminous mines, and these and other units were increasingly employed as auxiliaries in both anthracite and bituminous.

Mobile coal-drilling units, sometimes supplemented by rotary brooms, were more widely used in preparing coal for loading, and a few additional companies installed mobile crushing and loading plants in their pits.

AUGER MINING

Augering from the last cut again registered a major advance in 1952. New highs in output per man and per machine were registered, and many mining companies were incorporating augering into their regular production cycle. The depth to which augering can be done increased in 1952, though it still is less than 200 ft as a rule.

In addition to augering, some mining companies integrated conventional mining equipment into the stripping cycle, while announcement of the remotely controlled underground miner able to drive up to 1,000 to 1,500 ft opened up the possibility of widespread adoption to complement normal stripping.

TRANSPORTATION

Bigger haulage units again received active consideration in 1952. Tractors were either being developed or built with double engines and sufficient tractive efforts to handle semitrailers up to 100 tons capacity, compared to the present limit of about 80 tons. Similar increases were effected or were being planned in the capacities of straight trucks. Interest in conveying or pumping coal from pits increased in 1952, though installations still are in the future.

STRIPPING SERVICE

Paper entered the stripping industry in another form in 1952 with at least one operation using resin-bonded sheets cold-formed into flume sections for easy construction of surface drains. Plastic and quick-coupling aluminum pipe registered major gains.

Radio installations showed a substantial increase, and there was increased emphasis on maintenance. Additional centralized automatic lubricating systems were installed on large stripping units, and emphasis was placed on field repair methods and equipment, including such facilities as portable welding shops for truck bodies. Special tire shops reflected the growing importance of automotive haulage, also marked by

New Anthracite Preparation Facilities in 1952*

Coal Company	Plant Location	Capacity, TPH	Preparation Equipment
Beaver Brook Coal Co.	McAdoo, Pa.	100	Western Machinery[1]
D. & Z. Coal Co.	Shamokin, Pa.	7	Menzies[2]
Dayton Coal Co.	Williamstown, Pa.	15	Wilmot[3]
Diminick Coal Co.	Paxinos, Pa.	20	Wilmot[3]
		7	Menzies[2]
Erie Concentrated Coal Co.	Avoca, Pa.	35	Wilmot[4]
Glen Alden Coal Co.	Plymouth, Pa.	100	Wilmot[3]
	Plymouth, Pa. (2)	100	Wilmot[4]
	Junedale, Pa. (2)	105	Wilmot[3]
Legal Coal Co.	Goodsprings, Pa. (2)	12	Deister Concentrator[7]
Lehigh Valley Coal Co.	Wilkes-Barre, Pa. (6)	695	Wilmot[3]
Locust Valley Coal Co.	Leesport, Pa. (4)	20	Deister Concentrator[7]
Harry J. O Brien	Pine Grove, Pa.	6	Deister Concentrator[7]
Old Mill Coal Yard	Stine's Mill, Pa.	35	Wilmot[4]
C. M. Otto & Sons	Higgins, Pa. (2)	30	Wilmot[3]
Pine Creek Coal Co.	Goodsprings, Pa. (3)	22	Deister Concentrator[7]
Pennsylvania Water & Power Co.	Safe Harbor, Pa.	194	Western Machinery[8]
	Safe Harbor, Pa. (2)	10	Deister Concentrator[7]
Philadelphia & Reading Coal & Iron Co.	Locust Summit, Pa. (30)	120	Denver Equipment[10]
Reidinger Coal Co.	Paxinos, Pa.	7	Menzies[2]
John E. Schumacher & Sons	Pottsville, Pa. (3)	28	Deister Concentrator[7]
Swatara Coal Co.	Minersville, Pa.	100	Western Machinery[1]

*Includes installations of new preparation units in existing structures. The number of preparation units, where known, appears in parentheses following the plant address.

1. Wemco Mobil Mill with drum separator. 2. Menzies cone separators. 3. Wilmot jig equipment. 4. Froth-flotation plant. 5. Hydrotator equipment.

6. Hydrotator classifier equipment. 7. No. 7 SuperDuty Diagonal-Deck tables, plus two Concenco revolving feed distributors for Pennsylvania Water & Power Co. 8. Hydrotator, Wilmot-Daniels heavy-density and Hydrotator classifier equipment. 9. Silt plant, including froth flotation and tabling. 10. Including 24 Sub-A Lasseter-type flotation cells and six Super-Agitators and Conditioners.

increasing use of torque converters on haulage units and bulldozers.

Activity in power for stripping equipment included wider use of modern junction equipment, ground protection and special facilities for reducing low-voltage hazards.

RECLAMATION

A major increase in reclamation work marked stripping in 1952. Emphasis again was on cattle-raising and on other crops, including the row variety. This resulted in an increase in leveling of spoils. Major attention was given to preventing acid formation and to stopping its discharge to streams. Pennsylvania, as a result, issued a manual showing practical ways of preventing acid formation and runoff.

Preparation

AS IN 1951, fine coal absorbed a lion's share of the preparation effort in 1952, along with dewatering and drying, including filtering. Heavy media, flotation and the use of tables achieved substantial gains. A major new development was the expansion of electric heating to prevent blinding of screen cloth.

CLEANING

Heavy-media and heavy-density equipment again scored gains in coarse-coal cleaning, though jigs and other older equipment using water continued to give good accounts of themselves in terms of capacity. The coal-washing table also registered additional gains in coarse-coal cleaning with installations to handle coal up to 1¼ and 1½ in in the bituminous field.

Dual-density and three-product separators came more to the fore in heavy-media work in 1952, and additional rotary breakers were installed for rough cleaning ahead of washers.

Tables, air cleaners, froth-flotation units, upward-current washers and hydroclassifiers were installed in numbers for cleaning fine anthracite and bituminous coal in 1952, in addition to launders and the more-conventional units, including heavy-media equipment. Special classifiers and, in the anthracite region, riffle screens, along with desliming units, were employed for conditioning the feed and adjusting solids-liquid ration in fine-coal cleaning. Cyclones and centrifugal-type horizontal solid-bowl machines also were applied to cleaning the extreme fines.

Air-cleaning units normally were installed to handle coal up to ¼ to ¾ in, and in some instances were preceded by heat-drying units. Tables, upward-current equipment and classifiers were employed to clean No. 1 down to No. 5 buckwheat in the anthracite region, and from ¼ to ¾ down to slurry at bituminous mines. Flotation, largely installed by anthracite in 1952, handled sizes from 1/16 down as a rule. A common top limit was 28 mesh.

DRYING AND CLARIFICATION

Both mechanical and heat drying advanced in 1952, with particular progress in the fine sizes. Centrifugal driers alone or in combination with heat equipment were installed for coal up to 5/16 to ⅜ as a rule, with some special machines for final polishing of even finer sizes. Heat equipment was installed for both fine material—around ¼ x 0— and for coarser coal up to 1¼ in.

Water clarification and increased emphasis on closed circuits brought filters—vacuum, disk and centrifugal—more to the fore. These frequently were combined with rake or cyclone thickeners or spiral units.

SIZING AND LOADING

The vibrating screen continued to gain in sizing in 1952 as well as in dewatering. Electric cloth heating was brought out to prevent blinding and increase efficiency. Crushing was marked by the introduction of two-stage equipment and by motor-operated remotely-controlled adjusting facilities.

Automatic samplers found increasing use, along with tramp-iron removal equipment, including one magnet with auxiliary battery power. Dustproofing with oil or chemicals—chiefly oil—continued to gain, and ultraviolet light was suggested as a means of checking oil coverage.

PREPARATION SERVICE

Plants designed to receive truck and railroad coal for "in-transit" preparation increased in 1952, and with this development the number of car shakers for unloading grew. The use of rubber and plastic pipe increased, and there was a considerable increase in plants installing facilities to control acidity of wash water, usually by liming. Additional metal protection included special preservative paints, porcelain bonded to chutes and conveyors, special bonded rubber sheeting, and a wider use of stainless steel not only for screens but for chutes and—even—bolts exposed to water.

Dusttight and moistureproof motors and controls were widely installed, and the trend to concentrating plant controls in cabinet centers was more pronounced. Motorized head pulleys for belt conveyors gained in 1952, along with shaft-mounted torque-arm reducers for drives. Prelubricated and fan-cooled motors with outside ducts increased in favor, and maintenance also was improved by expansion in the number of centralized automatic lubricating systems. Pumps were improved to facilitate inspection and return to service by unit replacements.

Coal and Safety In 1952

A NEW LOW in both deaths and in fatality rates was marked up by the coal-mining industry in 1952. For anthracite and bituminous combined, total deaths are estimated at 546 for the year. The next best year was 1949, with 585 deaths.

In terms of fatalities per million tons, the industry attained a rate of 1.08 in 1952 on a basis of 546 deaths and 504,974,000 tons. The rate in 1951 was 1.36 fatalities per million tons, based on 785 deaths and 576,335,000 tons. In terms of deaths per million man-hours of exposure, the rates were 0.84 in 1952 and 1.06 in 1951.

The new low in 1952 was a continuation of a trend dating back to 1940 and interrupted only in years of major disasters. Thus, the fatality rate per million man-hours jumped to 1.61 in 1942; to 1.22 in 1947 as a result of the Centralia explosion; and to 1.06 in 1951, following the Orient No. 2 explosion and four other major disasters claiming a total of 157 lives.

FOUNDATIONS FOR PROGRESS

Significantly, the fatality rates in 1952 were lower than in 1949 and 1950—the only "disaster-free" years in coal-mining history. This is further evidence of the solid achievements of 1952, in large part a reflection of the following developments:

1. Increased production by stripping and machine mining underground.
2. A more-thorough check on hazards as a result of federal inspection, state inspection and more care by mining men themselves.
3. Increased attention to the removal of physical hazards, including conditions leading to fires and explosions.
4. Greater stress on education to eliminate accidents, reflected in a further rise in safety and accident-prevention training.
5. A significant growth in safety consciousness and with it increased cooperation in safe operation.

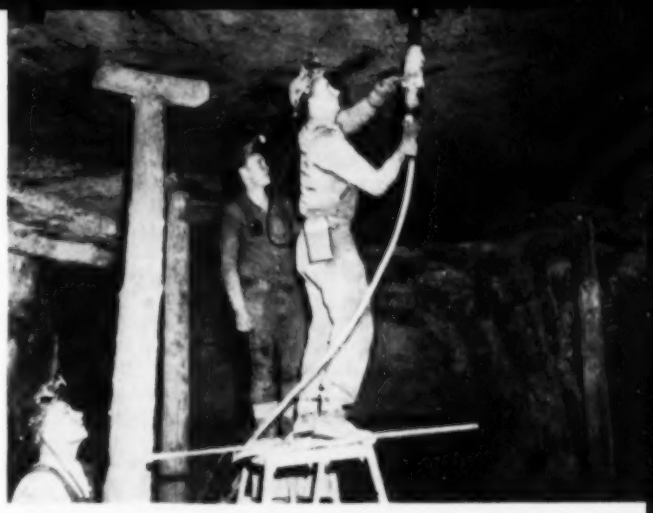
BITUMINOUS RATE DROPS

Bituminus mining in 1952 resulted in an estimated 447 deaths in producing 465,000,000 tons, compared to 685 deaths and 533,665,000 tons in 1951. This resulted in rates of 0.96 per million tons and 0.82 per million man-hours, compared to 1.28 per million tons and 1.08 per million man-hours in 1951. In terms of total deaths, the next best bituminous year was 1949, when 494 were killed in mining operations.

Fatalities in anthracite mining in 1952 are estimated at 99, compared to 100 in 1951 and 91 in 1949—the all-time low year. The fatality rate per million tons in 1952, based on 39,974,000 tons, was 2.48, against 2.34 in 1951. The rate per million man-hours, however, was 0.94 in both years.

DISASTER LAW PASSED

A major development in the field of governmental activity in mining safety was the passage of the McConnell Federal Coal Mines Safety Act in July. Much more limited in scope than earlier bills providing for complete federal jurisdiction over coal-mining saftey, it was aimed primarily at eliminating disasters. Provision was made for formal cooperation between state agencies and the federal inspection service. Though federal and state men are ex-



BOLTING—Major contributor to lower accident rates through reducing injuries and fatalities from falls.

HAULAGE—Modern rolling stock and good haulageways increasingly used to reduce physical hazards.

EDUCATION AND TRAINING—Second major line of attack to promote safety consciousness and cut accidents in 1952.

pected to act jointly, power was given federal inspectors to act alone in ordering the closing of mines or sections where conditions make a disaster imminent. Otherwise, the state inspector must concur.

A board of review was set up and provision is made for appeal to the courts. Gassy mines were defined as those where methane had been ignited or 0.25% is found in open workings.

The Bureau of Mines moved cautiously into administration of the law. It was October before the first federal-state agreement—with Wyoming—was drawn up. Neither did federal inspectors exercise their closing powers until October. They shut two mines—one in West Virginia and one in Pennsylvania—and reclassified one mine as gassy. Both operations shortly reopened after correction of the conditions.

BOLTING SOLIDIFIES GAINS

Perhaps the most-important single factor in the improvement in the bituminous safety record in 1952 was roof-bolting. There was a major gain in the use of bolts, and with additional experience additional techniques were being worked out. As an example, one operation starts with short bolts in low coal, and then replaces these—or supplements them with long bolts—when top or bottom is taken for height. And bolting was proving its effectiveness as a protective medium by increased use in bad-top areas where other means of support could not be depended upon or were extremely costly.

The rise in bolting focussed increased attention on the problem of handling the dust resulting from the necessary drilling in rock. Additional work was done on both wet and dry methods, with emphasis on dry collectors. That some degree of success is being attained can be gaged from the fact that a portable electrically powered dust collector received Bureau of Mines approval early in 1953.

HAULAGE NEW TARGET

With real progress being made, through roof-bolting and otherwise, in reducing accidents from falls of roof and ribs, transportation loomed up proportionately larger as a cause of injuries and fatalities. Consequently, it was the object of increased attention not only from state and federal authorities but from mining men as well.

The year 1952, as a result, witnessed increased stress not only on education and training to prevent haulage accidents but on improved equipment and methods. There was, for example, a substantial increase in the number of special man-trip cars installed, as well as in automatic couplers, dispatcher and block-signal controls, and in the installation of better tracks, better cars, better roof support and more refuge holes.

FIRE AND EXPLOSION

First tried in the United States in the early 30s and widely used abroad, a new experiment in degasification of coal seams by boreholes from the surface got under way in northern West Virginia in 1952. The year also witnessed a major increase in attention to the hazards presented by oil and gas wells, which was reflected in an increase in cooperative efforts between mine and well operators to safeguard mining properties.

Coursing of air and more-positive methods of directing it to the working faces received increased emphasis in 1952, along with greater attention to sprinkling, rock-dusting and other measures designed to control coal dust or render it harmless. Special attention was given to the development and use of dust-killing sprays for use on continuous miners, as well as on conventional loading equipment, and additional companies set up formal departments to handle the dust problem, whether rock or coal.

Measures to remove ignition sources naturally included increased stress on permissible equipment, including better cables for machines. A new "Safety Code for Installing and Using Electrical Equipment in and About Coal Mines (M.2-1)" was published by the Bureau of Mines in 1952 and is seen as the foundation for new advances in electrical safety in the future.

Fire-fighting equipment was installed in increasing volume in 1952, along with additional frame-grounding equipment. Developments in the latter category included a new trailing cable with a pilot wire to permit a circuit breaker to cut power off the machine instantly in the event of a failure in the insulation around the positive conductor.

Operators using belt conveyors, as well as manufacturers and safety authorities, delved deeper into the problem of preventing ignition of belts and the propagation of fires resulting from such ignitions.

TRAINING EMPHASIZED

The year 1952 witnessed a wide increase in acceptance of the idea that safety consciousness, backed up by training in accident-prevention, is as important, if not more so, than elimination of physical hazards in attaining mine safety. As a result, there was a major increase in the number of both supervisors and men completing courses in accident-prevention, first aid and mine rescue, with most-encouraging results. A growing spirit of cooperation was reflected in a rebirth of the idea of safety organizations, either for employees or supervisors alone, or for both together. Thus, a number of new Holmes safety chapters and rescue associations were formed in 1952—a reversal of a trend toward discontinuing such organizations that set in several years ago.

U. S. Coal-Mine Fatalities During 1952 and 1951*

Cause and Location	Bituminous				Anthracite				Total			
	Fatalities		Rate[1]		Fatalities		Rate[1]		Fatalities		Rate[1]	
	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951
Falls of roof and face	239	312	0.51	0.58	45	51	1.13	1.20	284	363	0.56	0.63
Haulage	100	103	0.22	0.19	17	14	0.43	0.33	117	117	0.23	0.20
Explosions: Local	5	1	0.01	[2]	4	4	0.10	0.09	9	5	0.02	0.01
Major	6	152	0.01	0.28		5		0.12	6	157	0.01	0.27
Explosives	5	7	0.01	0.01	4	5	0.10	0.12	9	12	0.02	0.02
Electricity	10	19	0.02	0.04		1		0.02	10	20	0.02	0.03
Machinery	15	19	0.03	0.04	2		0.05		17	19	0.03	0.03
Mine fires	4		0.01						4		0.01	
All other	4	8	0.01	0.01	13	9	0.33	0.21	17	17	0.03	0.03
Total underground	388	621	0.83	1.16	85	89	2.13	2.09	473	710	0.94	1.23
Surface	35	35	0.08	0.07	8	8	0.20	0.19	43	43	0.09	0.07
Stripping	24	29	0.05	0.05	6	3	0.15	0.07	30	32	0.06	0.06
Grand Total	447	685	0.96	1.28	99	100	2.48	2.34	546	785	1.08	1.36

* All figures are subject to revision. [1] Fatalities per million short tons. [2] Less than 0.005.

Equipment Sales in 1952

In contrast to further increases in percentage of coal mechanically loaded and cleaned, sales of underground mining and haulage equipment, and of mechanical-cleaning equipment, fall off in 1952.

By W. H. YOUNG, Chief, Bituminous-Coal and Lignite Section, and R. L. ANDERSON, Mining Engineer, U. S. Bureau of Mines, Washington, D. C.

SHIPMENTS of mechanical-loading equipment for underground use in coal mines in the United States, in terms of capacity, were 34% less in 1952 than in 1951. The capacity of mechanical-cleaning equipment sold for use at bituminous mines was 37% less. Shipments of shuttle cars and face conveyors for use in United States coal mines decreased 16 and 25% respectively, while shipments of "mother" conveyors declined 40% in 1952 compared to 1951.

This survey was made possible by the courteous cooperation of all known manufacturers of mechanical-cleaning equipment for bituminous mines and of manufacturers of mechanical-loading and supplementary haulage equipment for use in all United States coal mines. Data from various trade journals also were utilized.

Mechanical-loading units and supplementary haulage equipment "Sales in 1952" represent shipments made during the year. Of the total capacity of mechanical-cleaning equipment sold in 1952, 27% was placed in operation in that year. The remainder will be installed later.

Mechanical Loading

Bituminous coal and lignite mechanically loaded in underground mines increased from 272,724,612 tons in 1950 to 304,225,921 tons in 1951, or 12%. Mechanically loaded anthracite dropped from 12,335,650 to 10,847,787 tons, or 12%, in the same period.

Table I shows data on bituminous and lignite production by methods of mining and mechanical cleaning for 1950-52, inclusive. The percentage of this total output mechanically loaded and cleaned continues to rise. During 1952, approximately 81% of the total

Table I—United States Bituminous and Lignite Production by Methods of Mining and Mechanical Cleaning

	1950		1951		1952*	
	Thousands of Net Tons	Per Cent of Total	Thousands of Net Tons	Per Cent of Total	Thousands of Net Tons	Per Cent of Total
Surface stripping	123,467	23.9	117,618	22.0	103,000	22.2
Hand-loaded underground	120,119	23.3	111,791	21.0	88,000	18.9
Mechanically loaded underground	272,725	52.8	304,256	57.0	274,000	58.9
Total production	516,311	100.0	533,665	100.0	465,000	100.0
Mechanically cleaned	198,699	38.5	240,010	45.0	230,000	49.5

* Preliminary

Table II—Underground Bituminous and Lignite Production, by Methods of Loading

	1950		1951		1952*	
	Thousands of Net Tons	Per Cent of Total	Thousands of Net Tons	Per Cent of Total	Thousands of Net Tons	Per Cent of Total
Loaded by machine	237,279[1]	60.4	266,673[2]	64.1	.....[3]	....[3]
Handled by conveyors	35,446[4]	9.0	37,583[5]	9.0	.....[3]	....[3]
Total mechanically loaded	272,725	69.4	304,256	73.1	274,000	75.7
Hand-loaded	120,119	30.6	111,791	26.9	88,000	24.3
Total underground production	392,844	100.0	416,047	100.0	362,000	100.0

* Preliminary.

[1]. Includes mobile loaders, continuous-mining machines, scrapers, and conveyors equipped with duckbills or other self-loading heads.

[2]. Includes mobile loaders, continuous-mining machines, scrapers, conveyors equipped with duckbills or other self-loading heads, and augers.

[3]. Included under "Total Mechanically Loaded."

[4]. Includes hand-loaded conveyors and pit-car loaders.

[5]. Hand-loaded conveyors.

Table III—Mechanical-Loading and Conveyor Units Sold for Underground Use, as Reported by Manufacturers

	1947	1948	1949	1950	1951	1952	Per Cent Change 1952 From 1951
Bituminous and Lignite Mines:							
Mobile loaders[1]	485	723	286	289	287	206	— 28.2
Scrapers[2]	12	17	8	1	4	8	+100.0
Shuttle cars	...[3]	...[3]	543	465	524	440	— 16.0
Conveyors[4]							
"Mother"	200	230	116	132	114	67	— 41.2
Room or transfer	846	1,025	394	316	297	155	— 47.8
Face[5]	224	356	160	116	111	76	— 31.5
Pennsylvania Anthracite Mines:							
Mobile loaders	1	2	...	...	...	...	.....
Scrapers[2]	23	32	10	8	8	5	— 37.5
Shuttle cars	...[3]	...[3]	...	...	...	...	.....
Conveyors[4]:							
"Mother"	4	5	...	1	...	...	.....
Room or transfer	141	184	147	57	34	34	.....
Face[5]	1	18	5	..	8	13	+ 16.3
Number manufacturers' reporting	23	22	22	20	21	22	.....

[1]. Includes continuous mining machines beginning in 1948.

[2]. Reported as scrapers or scraper haulers and hoists.

[3]. Not available. Total number of shuttle cars sold, 1936-48 inclusive, was 2,849.

[4]. Conveyors classified as to length the power unit has capacity to handle "mother" over 500 ft; room or transfer, 100 to 500 ft; face, under 100 ft.

[5]. Includes "bridge" conveyors beginning in 1950.

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Table IV—Sales of Mechanical-Loading Equipment in 1952, Compared With Machines in Active Use in Preceding Years

	Number of Machines in Active Use, as Reported by Mine Operators							1952 Sales, as Reported by Manufacturers
	1945	1946	1947	1948	1949	1950	1951	
Bituminous and Lignite Mines:								
Mobile loaders	2,590	3,200	3,569	3,980 [1]	4,205 [1]	4,318 [1]	4,410 [2]	206 [1]
Scrapers	87	75	67	56	46	39	22	8
Pit-car loaders	142	93	71	37	17	12	[3]	[4]
Conveyors equipped with duckbills or other self-loading heads	1,383	1,521	1,531	1,632	1,483	1,329	1,242	[5]
Hand-loaded room conveyors (number of units)	3,385	3,470	3,979	4,125	4,312	4,434	3,904	155
Pennsylvania Anthracite Mines:								
Mobile loaders	20	27	25	19	27	30	43	
Scrapers	548	564	594	643	589	556	528	5
Hand-loaded room conveyors (number of units)	3,006	3,233	3,457	3,562	3,618	3,460	3,282	34

[1]. Includes continuous-mining machines.
[2]. Includes continuous-mining machines and augers.
[3]. Canvass of pit-car loaders in use discontinued in 1951.
[4]. Canvass of sales of pit-car loaders discontinued in 1945.
[5]. Sales of conveyors equipped with duckbills or other self-loading heads are included with hand-loaded room conveyors.
[6]. Includes pit-car loaders and conveyors equipped with duckbills or other self-loading heads.

Table V—Mechanical-Loading Equipment in Actual Use in 1951, by States, Compared With Sales in 1952

	Mobile Loaders		Scrapers		Room Conveyors[1]	
	In Use in 1951[2]	Sales in 1952[3]	In Use in 1951	Sales in 1952	In Use in 1951	Sales in 1952
Bituminous and Lignite Mines:						
Alabama	144	7	1	...	235	...
Alaska	...	...	...	...	2	...
Arkansas	...	...	...	...	85	
Colorado	40	...	1	6	279	8
Illinois	475	13	...	...	20	5
Indiana	158	1	...	...	4	1
Iowa	2	...	...	...	4	...
Kentucky	500	19	...	...	605	23
Maryland	4	...	...	...	18	...
Montana	30	...	...	...	14	...
New Mexico	16	...	...	...	1	7
North Dakota	3	1	...	...	...	...
Ohio	229	5	...	...	95	...
Oklahoma	5	1	...	1	131	...
Pennsylvania	1,015	58	12	...	895	18
Tennessee	36	1	...	...	110	2
Utah	127	6	...	1	85	...
Virginia	131	7	1	...	208	...
Washington	1	3	6	...	93	1
West Virginia	1,462	82	...	...	2,030	90
Wyoming	32	2	1	...	232	...
Total	4,410	206	22	8	5,146	155
Pennsylvania Anthracite	43	...	528	5	3,282[4]	34
Grand Total	4,453	206	550	13	8,428	189

[1]. Includes hand-loaded conveyors and conveyors equipped with duckbills or other self-loading heads.
[2]. Includes continuous-mining machines and augers.
[3]. Includes continuous-mining machines.
[4]. Includes pit-car loaders.

Table VI — Sales of Coal-Recovery Augers to United States Bituminous Mines, 1945-52, Inclusive

	Surface or Strip Mines	Underground Mines
Number of augers shipped	259	12
Auger diameter, inches:		
Minimum	16	18
Maximum	52	30
Length auger sections, feet:		
Minimum	6	4
Maximum	34	6
Maximum depth of hole recommended by manufacturer, feet	204	100

output was either mechanically loaded at underground mines or loaded by power shovels at strip mines.

Underground production of bituminous coal and lignite, by methods of loading, is shown in Table II. The 1952 preliminary figures show that 76% of the underground output was loaded mechanically. The remaining 24% was hand-loaded into mine cars.

Types of Units Sold—Table III lists the number of mechanical-loading and conveyor units shipped for underground use at all coal mines in the United States for 1947-52, inclusive. Shipments of mobile loaders, which include continuous-mining machines, decreased from 287 in 1951 to 206 in 1952. Shipments of scrapers increased 8% and shuttle cars declined 16%. "Mother," room or transfer, and face conveyors all decreased in 1952, compared to 1951.

Types of Mechanical-Loading Units Sold Compared With Units in Use—Table IV shows the trend in demand for various types of mechanical-loading equipment. There has been a substantial increase in the use of mobile-loading and continuous-mining machines. All other types, however, have marked up a decrease in recent years.

Table V shows the number of mechanical-loading units shipped to various states in 1952 and the number in

use in 1951, as reported by mine operators. Sales of room conveyors as listed in Table V are not exactly comparable with the number in use. To avoid duplication in tonnage mechanically loaded, the mine operator was requested to report "hand-loaded" and "self-loading" conveyor tonnage only. Therefore, room conveyors loaded by mobile loaders are not included with "Room Conveyors in Use in 1951."

Coal Augers—The use of augers for coal recovery began about 1946. Table VI gives data on sales of augers for the first time. Reports were received from four manufacturers. Practically all shipments to date have been to strip mines. No shipments have been made to Pennsylvania anthracite mines.

Haulage Equipment

Face Conveyors—A face conveyor is 10 to 100 ft long and is used parallel to the face of a room to move material along the face to a room conveyor. Table III lists total sales for 1947-52, inclusive, and Table VII lists sales by states for 1951 and 1952. Data on number in use are not available.

Shuttle Cars—Sales of shuttle cars decreased from 524 in 1951 to 428 in 1952. Shipments to various states in 1951 and 1952 are shown in Table VII. There were 3,758 shuttle cars in use in bituminous and lignite mines in 1951. Details on number of cable-reel and battery cars in use, by states, are given in Bureau of Mines Mineral Market Report 2102, p 25.

"Mother" Conveyors—For the purpose of this study, a "mother" conveyor is defined as a sectional, extensible, power-driven conveying unit that can handle over 500 ft of conveyor. Main-slope conveyors are excluded. Table III lists sales for 1947-52, inclusive, and Table VII shows shipments by states in 1951 and 1952.

In 1951, 372 bituminous mines used 325 mi of "mother" conveyors. Detailed data on units in use by states, 1945-51, inclusive, are given in Mineral Market Report 2012, pp 26-27.

Mechanical Cleaning

Reports from 19 manufacturers of bituminous cleaning equipment show that the total capacity of 1952 sales was 8,700 net tons of clean coal per hour, compared to 13,900 tons sold in 1951—a decline of 37%. Sales in 1952, by type of equipment, show jigs first, followed by dense-media and pneumatic equipment.

The capacity of all types of equipment sold in 1952 for cleaning bituminous coal by wet methods was equivalent to 5% of the bituminous so cleaned in 1951, while the capacity of pneumatic equipment sold in 1952 was 10% of the tonnage so cleaned in 1951. Approximately 65% of the total capacity of cleaning equipment sold in 1952 was for additions to present installations. The remainder comprised new plants.

Table VIII gives data on bituminous coal cleaned in 1951 by states, and the annual capacity of equipment sold in 1952.

Table VII—Sales of Face Conveyors, Shuttle Cars and "Mother" Conveyors, 1951-52, by States

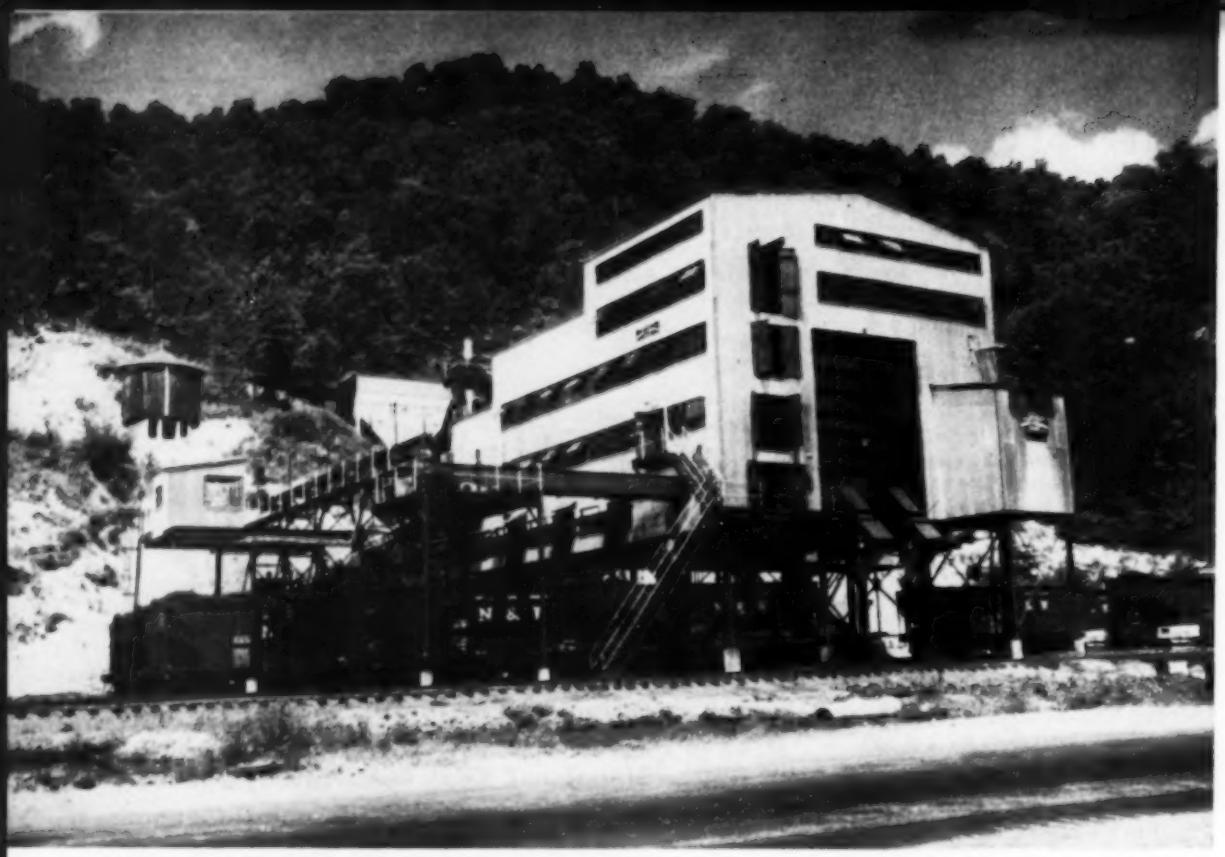
	Face Conveyors*		Shuttle Cars		"Mother" Conveyors	
	1951	1952	1951	1952	1951	1952
Bituminous and Lignite Mines:						
Alabama			26	35		
Colorado	2	3	6	5	6	
Illinois			70	14	19	14
Indiana			4			
Kentucky	24	13	46	42	18	17
New Mexico						2
Ohio			20	4	2	1
Oklahoma		4		2	3	
Pennsylvania	19	10	131	127	24	6
Tennessee			6	2	1	
Utah			8	7	2	1
Virginia	6	2	8	24	3	
West Virginia	60	44	197	166	36	26
Wyoming			2			
Total	111	76	524	428	114	67
Pennsylvania Anthracite	8	13				
Grand total	119	89	524	428	114	67

* Includes "bridge" conveyors and all other conveyors from 10 to 100 ft long.

Table VIII — Bituminous Coal Mechanically Cleaned in 1951, Compared With Sales of Mechanical-Cleaning Equipment in 1952, by States

	Number of Plants in Operation	1951 Net Tons of Cleaned Coal	Percent Output Mechanically Cleaned	Annual Capacity of Equipment Sold in 1952, Net Tons[1]
Alabama	48	11,069,682	81.4	
Alaska	2	195,241	39.5	
Arkansas	2	17,916	1.6	
Colorado	6	1,649,012	40.2	
Illinois	67	39,606,748	73.1	1,160,000
Indiana	27	14,060,674	72.3	1,035,000
Kansas	5	1,189,092	60.6	
Kentucky	75	26,923,389	35.9	1,633,000
Missouri	10	2,865,138	87.6	
Montana	2	126,115	5.4	
New Mexico	1	59,635	7.6	
Ohio	29	13,939,962	36.7	
Oklahoma	6	692,692	31.2	
Pennsylvania	83	46,325,054[2]	42.8	3,929,000
Tennessee	9	607,392	11.2	
Utah	6	2,039,335	33.2	[3]
Virginia	29	7,356,766	34.4	[3]
Washington	17	809,619	94.5	[3]
West Virginia	201	70,476,346[4]	43.2	3,071,000
Undistributed				1,481,000
Total	625	240,009,808	45.0	12,309,000

[1]. Based on average days mines were active in 1951 and 7.0 hr per day.
[2]. Includes some coal mined in Pennsylvania and cleaned in Ohio, and a small tonnage mined in other states and cleaned at a consumer-operated plant in Pennsylvania.
[3]. Included in "Undistributed."
[4]. Includes some coal mined in West Virginia and cleaned in Pennsylvania.



NEW 350-TPH RED JACKET PLANT loads on five tracks in the reverse of the usual order. The lump track is next to the hill and the carbon track is on the near side. Trips from the two seams mined simultaneously can dump into the 400-ton bin (behind plant) at the same time, and coal is lowered by a 422-ft belt conveyor into the top rear of the plant.

Quality Preparation for Contiguous-Seam Mining

Red Jacket combines favorable natural conditions, modern preparation methods and efficient contiguous-seam operation to provide premium-quality "Southern Belle Coal" from new No. 17 plant. Mechanized mine now developing to 4,000 tpd will supply some 27 million tons to tailor-made plant. Carbon-upgrading section scheduled for early addition.

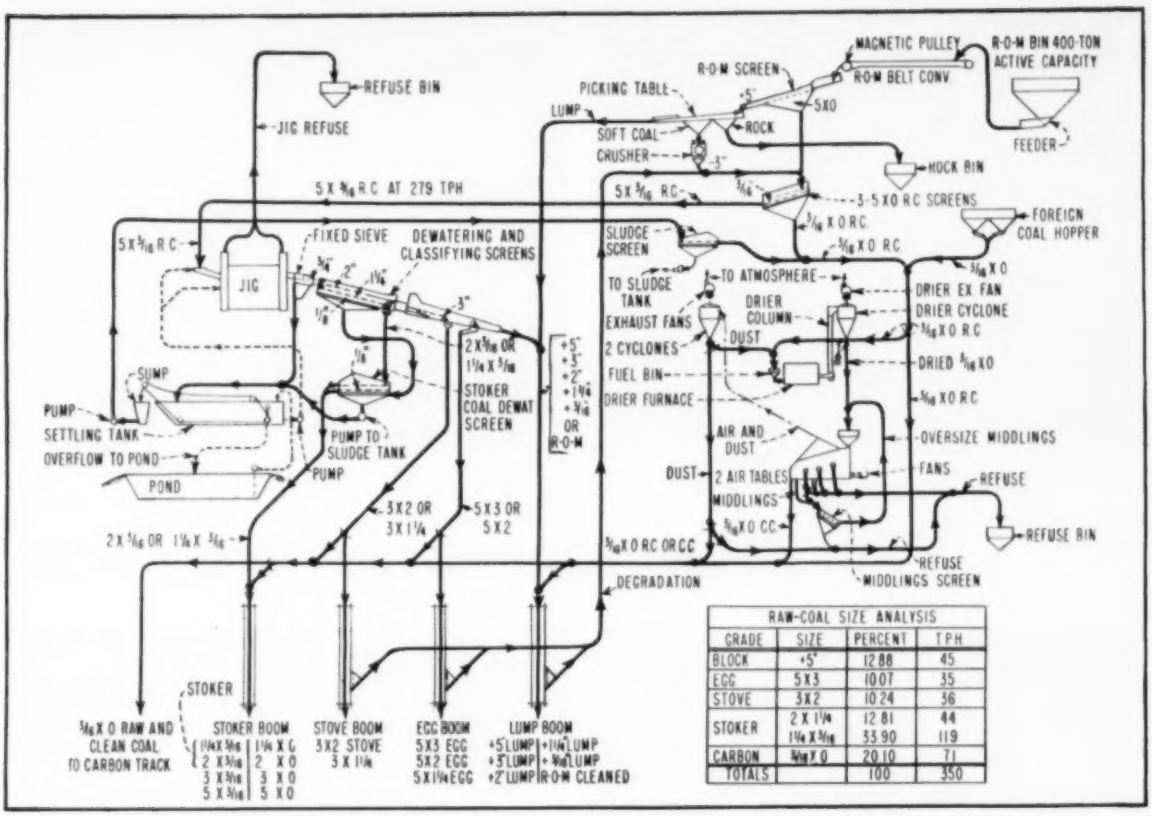
TO PRODUCE the best coal possible—a real premium coal—was the objective of officials of the Red Jacket Coal Corp., Red Jacket, W. Va., in planning the new No. 17 preparation plant in consultation with engineers of the Roberts & Schaefer Co., which handled the design details, fabrication and erection.

With the main section of the 350-tph plant in operation since last May, that goal has been achieved for sizes above 3/16 in and the resulting premium products are being marketed as "Southern Belle Coal." Completion of a pre-drying and air-cleaning addition to be built soon will upgrade the 3/16x0 carbon from a medium to good-quality steam coal to a premium by-product coal. Working two continuous seams simultaneously, this newest Red Jacket operation will supply 25 to 27 million tons to the new plant.

The new mine is one of seven of the Red Jacket Coal Corp., which has its operating management concentrated at Red Jacket, Mingo County, under the direction of William M. Ritter, vice president and general manager. The company maintains sales offices at 115 E. Rich St., Columbus, Ohio, and branch offices in Detroit, Greensboro and New York, under the supervision of R. W. Gruesser, vice president and sales manager. Six of the mines are in West Virginia, and the seventh in Buchanan County, Virginia. Shipments during 1951 totaled 3,746,355 tons. No. 17 mine, one of three in the vicinity of Red Jacket, is scheduled to turn out 4,000 tpd to help keep that division up to its norm of 10,000 tons daily.

MINE AREA ENLARGED

Purpose of the new mine and plant was to develop an area from which it



RAW-COAL SIZE ANALYSIS			
GRADE	SIZE	PERCENT	TPH
BLOCK	+5"	12.88	45
EGG	5 X 3	10.07	35
STOVE	3 X 2	10.24	36
STOKER	2 X 1 1/4	12.81	44
	1 1/4 X 3/16	33.90	119
CARBON	3/16 X 0	20.10	71
TOTALS		100	350

FIG. 1—FLOW SHEET for new No. 17 plant, including the carbon-treating plant to be added soon.

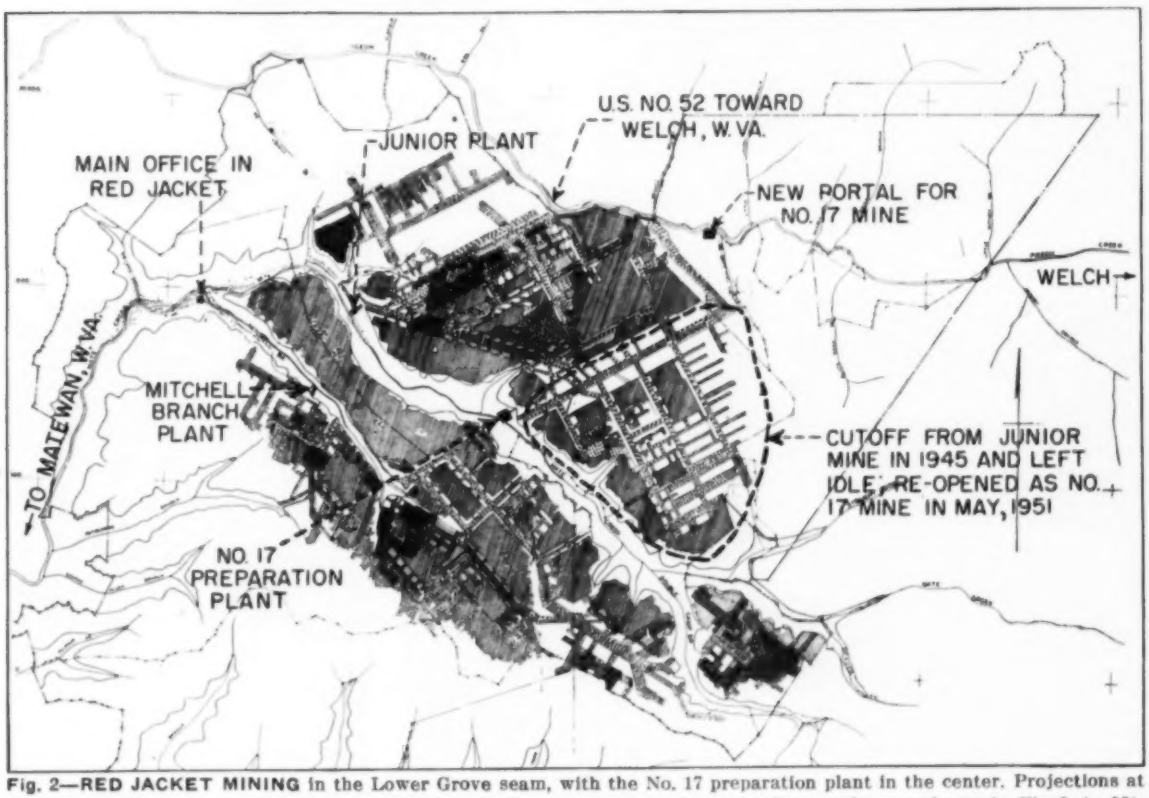
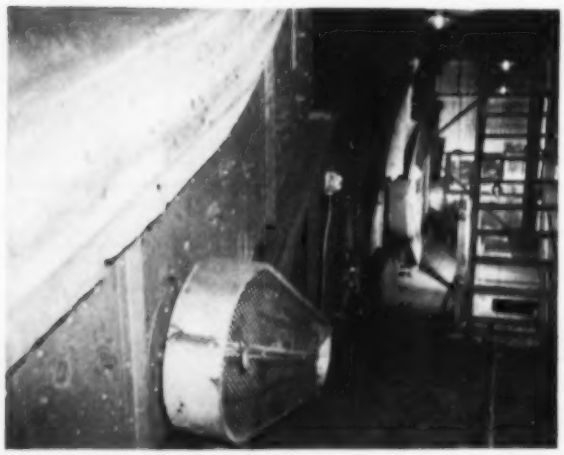


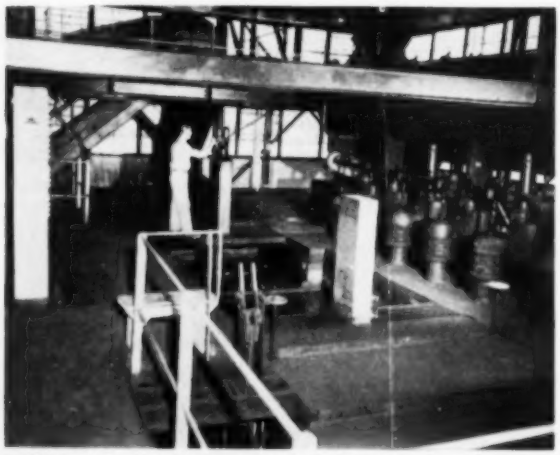
Fig. 2—RED JACKET MINING in the Lower Grove seam, with the No. 17 preparation plant in the center. Projections at the upper right are for new No. 17 mine. Workings in the upper seam, mined simultaneously, are shown in Fig. 3 (p 93).

1 **DROP-BOTTOM CARS** from both the lower (left) and upper seams can dump simultaneously into the 400-ton concrete hopper. Portal in back of the double track dump house (right photo) is that for the lower seam.

Processing coal for premium quality

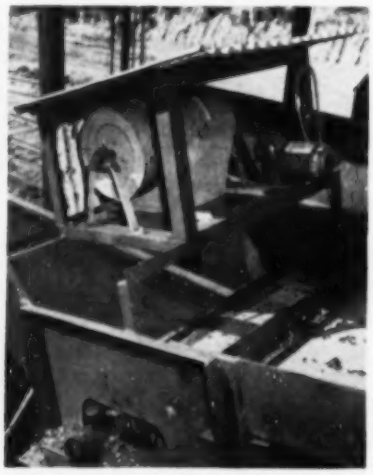


4 **THREE 6x14-FT VIBRATORS** in a row separate carbon from the minus 5-in coal before it goes to the jig.

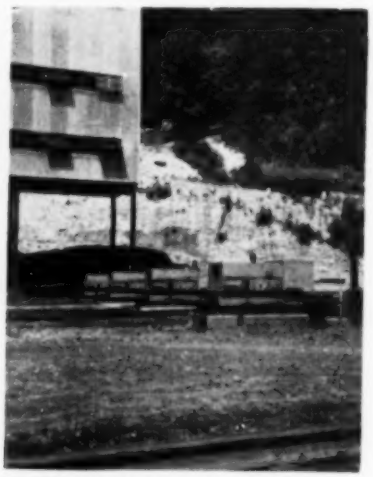


5 **THE JIG,** a 2-compartment 6-cell unit, is capable of handling 350 tph of 5x3/16-in coal.

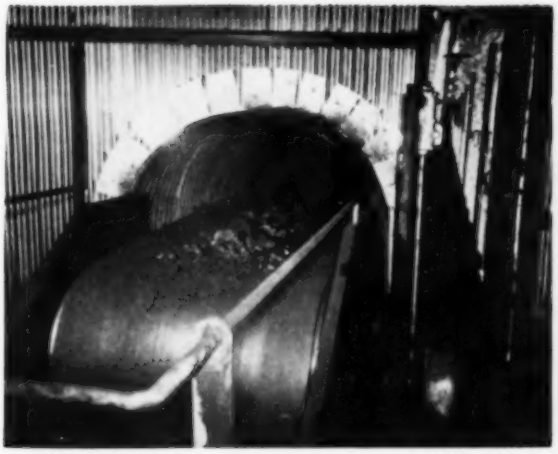
8 **LOADING BOOMS** for lump (left) and egg, have rescreens.



9 **"SOUTHERN BELLE" LABELS** are scattered into stoker by distributor.



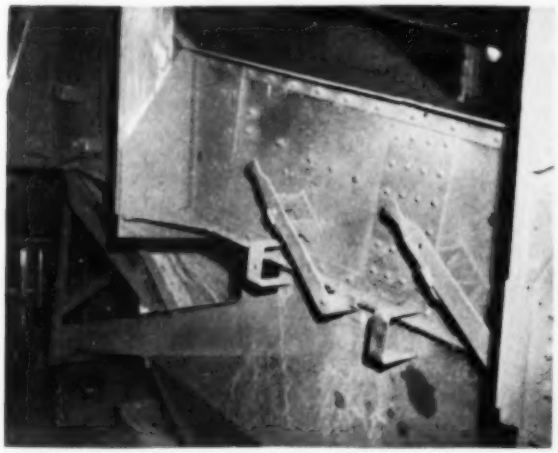
10 **LOADING** is on five tracks, each equipped with a hoist retarder.



2 **CONVEYOR** from hopper discharges over this magnetic pulley. Conveyor gallery shows through door at right.

3 **ON PICKING SECTION** of shaker, two men remove "soft" coal and rock from plus 5-in raw coal.

at Red Jacket's new 350-tph plant



6 **MIXING IS DONE** by adjusting gates in the primary dewatering and classifying unit. Two gate levers show.

7 **STOKER COAL** receives a secondary dewatering on this 6x16-ft vibrating screen.

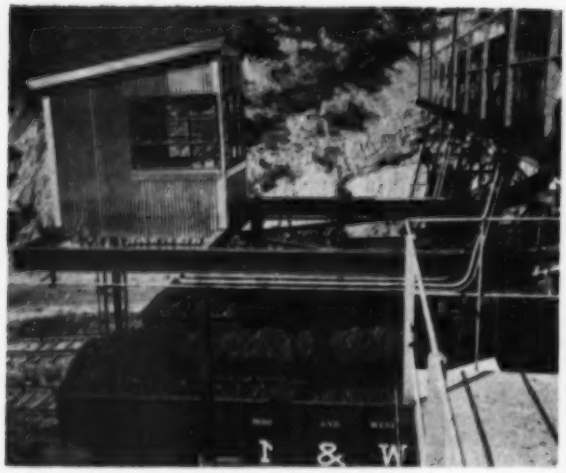
was not economical to haul to the company's existing plants. The 15,000,000 tons initially available was hardly enough to persuade the N & W Ry. to build a 2½-mi extension or to justify investment in an efficient preparation plant. However, since the tract contained the cream of the coal at Red Jacket—thicker coal and highest quality—a coal-land trade was made which added another 15,000,000 tons. In general, the enlarged area has the same mining conditions that have prevailed at Red Jacket over many years of operation in the upper and lower splits of the Cedar Grove seam and in the Coalburg seam. Some 20 yr ago, the initial tract in the No. 17 mine area was developed for about a mile from the drift portal and the coal hauled underground to Junior mine. In 1945, those workings were cut off from Junior mine and left idle until reopened in May, 1951, as No. 17 mine, with the coal temporarily loaded as run-of-mine.

SPECIAL FEATURES INCLUDED

The new plant, containing a Link-Belt 2-compartment 6-cell Baum jig capable of washing 350 tph, incorporates several special features. The settling tank has extra-heavy chains and high-torque starting equipment so that it is unnecessary to keep the sludge conveyor running when the tipple is shut down for short periods. There are only five conveyors in the plant. Need of a mixing conveyor was avoided by use of fly gates on the primary dewatering and classifying screens. The tipple control station is out beyond the end of the booms and carbon is loaded in line with the boom ends instead of back under the tipple. Track positions are the reverse of the usual—the lump track is at the back of the tipple, or in other words, on the side where the raw coal enters. Water is lime-treated to minimize corrosion of wet-coal handling equipment.

PROCESSING THE COAL

To begin the preparation process, a 48-in by 9-ft R&S reciprocating feeder delivers from a 400-ton concrete car-dump hopper to a 42-in belt conveyor extending 422 ft down a gentle slope to the top of the plant. The belting, made by the New York Rubber Co., has 6 plies of 32-oz duck, with a ⅛-in top cover and 1/16-in bottom cover, and rides on Link-Belt-Timken idlers.



TIPPLE-CONTROL HOUSE is positioned out beyond the booms to give the operator an end-on view of loading.

WATER IS TREATED before entering spray pump (left). Mixing tank, reagent feeder and control board are at right.

Plant design provides varied special operating features

LARGEST MOTOR in the plant is this 100-hp unit driving the 12x10-in circulating pump.

CONTROL CENTER for the plant is located in a fireproof room that is practically dust-tight.

The conveyor is driven by a 30-hp 1,800-rpm Reliance motor and discharges to the main shaking screen over a Dings magnetic pulley.

The shaker installation, including a picking section, is of the Parrish type hung on ash boards. Two men, inspecting the flow of plus 5-in, push rock into one pocket and soft coal into another. The small quantity of softer coal, which disintegrates badly and is higher in sulphur than the remainder of the seam, is crushed in an 18x24-in McLanahan & Stone unit, which is the only crusher in the plant. The product, crushed to 3 in, joins the 5x0 from the main screen and moves to a battery of three 6x14-ft Allis-Chalmers Ripl-Flo vibrators for removal of the 3/16 carbon.

Plus 5-in lump from the picking table passes directly to the lump loading boom. The 5x3/16 from the Ripl-Flo screens move into the jig at the rate of 265 tph, as the plant is now adjusted. Material rejected by the jig consists principally of sand rock and high-gravity slate from the top and bottom of the seam. Full-seam mining is the practice and some "come-and-go" partings are encountered. Washing is done at 1.60 sp gr and the ash is reduced to 4 or 5%, as indicated in Table I. Total reject from washing and hand-picking now runs 7 to 8% of the raw feed.

Primary dewatering and classifying screens, also of the Parrish type, consist of a 6x21-ft upper section and a 6x22-ft lower section. Stoker sizes receive a secondary dewatering on a 6x16-ft Allis-Chalmers Low-Head vibrator. The sludge screen is another Low-Head vibrator, measuring 4x12 ft. Stainless-steel cloth is used on bottom decks of the three raw-coal screens, on the bottom deck of the stoker-dewatering unit, and on the sludge screen.

CLOSED CIRCUIT UTILIZED

The settling tank is made of steel and is located on the second floor. Its conveyor, 8 ft wide with a 112-ft perimeter, features chains of extra-strong construction and a drive capable of high torque, which permits shutting down the conveyor when the plant is stopped.

Recirculating and effluent pumps,

both Allis-Chalmers Type CW, are 12x10-in rated at 5,000 gpm and 5x4-in rated at 500 gpm, respectively. The Type SSL 2½x2-in spray-water pump is rated at 200 gpm. Settling-tank overflow flows to a series of four sludge ponds, with the clarified water pumped back into the system from the fourth pond. This closed circuit was designed in cooperation with the state Water Control Board and has received a certificate of approval from that board.

Normally, creek water, which in the raw state has an acidity of pH 7, is used in the washer. Lime treatment is performed in the plant ahead of the spray-water pump, utilizing a Syntron reagent feeder that automatically puts a predetermined quantity of lime into the mixing tank as it is refilled through action of a float control. A water line was extended over a mile to the new plant so that well water from the company's town supply system can be drawn upon in case of prolonged dry weather that reduces the creek flow.

COAL TAGGED AUTOMATICALLY

The scraper-type loading booms are equipped with rescreens at the discharge ends. Mounted on the stoker boom is an automatic distributing device to place aluminum scatter tags in the car, currently adjusted to drop in tags at the rate of about 50 for each ton of coal. The 1-in-diameter tags, stamped from stiff sheet 0.004 in thick, carry the name "Southern Belle Coal" in raised letters. The lettering and crimped rims are bright aluminum, with a background of red.

Viking hot-oil equipment is installed for treating stoker coal to suppress dust and minimize freezing, utilizing Ashland Oil Co.'s Permatreat coal spray for that purpose.

The plant is constructed of steel, with concrete floors. Sheeting and roof are of corrugated aluminum, except for the R-O-M conveyor gallery covered with Armco Ingot curved corrugated galvanized steel. The electrical-control room, self-contained inside of the main plant, is partitioned and roofed with Johns-Manville Transite. Steam heat is used in the plant, distributed by Comet unit heaters furnished by the New York Blower Co.

Total connected horsepower for the plant is 691 (Table II) and all the principal motors are Reliance 440-v units. The electrical-control center was furnished by Westinghouse, as were the three 200-kva 2,300/440-v outdoor transformers.

Each of the five coal-loading tracks is equipped with a Brownie Model HG hoist retarder, driven by a 15-hp motor and providing 12,000-lb rope pull at 50 fpm. All sizes are routinely layer-loaded. Rock from the picking table and refuse from the washer accumulate in a 50-ton bin for disposal by truck.

Table I—Coal Shipments, Red Jacket No. 17 Plant

	Average Percentages, Dry Basis			
	Volatile	Fixed Carbon	Ash	Sulphur
Block, egg and stove	36.2	58.3	5.5	.8
Standard stoker	36.1	59.0	4.9	.8
Carbon (untreated)	33.8	57.3	8.9	1.0

Table II—Motor Drives, No. 17 Plant

	MOTORS			
UNIT	HP	RPM	TYPE	MAKE
Lump-boom conveyor	20	1,800/84	H.T.	Reliance
Egg-boom conveyor	20	1,800/84	H.T.	Reliance
Stove-boom conveyor	20	1,800/84	H.T.	Reliance
Stoker-boom conveyor	20	1,800/84	H.T.	Reliance
Carbon-loading conveyor	10	1,800/84	H.T.	Reliance
Mixing & degradation conveyor	15	1,800/84	H.T.	Reliance
Screen-effluent pump	7½	1,800	N.T.	Reliance
Stoker-dewatering screen	20	1,800	H.T.	Reliance
Dewatering & class. screens	25	900	H.T.	Reliance
Jig circulating pump	100	1,165	N.T.	Reliance
Jig air compressor	75	1,200	N.T.	Reliance
Jig No. 1 refuse elevator	5	1,800	N.T.	
Jig No. 1 refuse ejector	1	1,800	N.T.	
Jig. No. 2 refuse elevator	5	1,800	N.T.	
Jig No. 2 refuse ejector	1	1,800	N.T.	
Jig air valves	1½	1,800	N.T.	
5 x 3/16 R.C. conveyor	30	1,800/84	H.T.	Reliance
No. 2 R.C. 3/16 x 0 trans. conv.	15	1,800/84	H.T.	Reliance
3/16 x 0 R.C. conveyor	10	1,800/84	H.T.	Reliance
Sludge screen	5	1,800	H.T.	Reliance
Sludge-recovery conveyor	15	1,800/84	H.T.	Reliance
5 x 0 R.C. distributing conveyor	40	1,800	H.T.	Reliance
No. 1 5 x 0 R.C. vibr. screen	10	1,800	H.T.	Reliance
No. 2 5 x 0 R.C. vibr. screen	10	1,800	H.T.	Reliance
No. 3 5 x 0 R.C. vibr. screen	10	1,800	H.T.	Reliance
Soft-coal crusher	20	1,200	N.T.	Reliance
R-O-M screen & picking table	15	900	H.T.	Reliance
R-O-M conveyor	30	1,800	H.T.	Reliance
R-O-M reciprocating feeder	10	1,800/230	H.T.	Reliance
Spray-water pump	10	1,800	N.T.	Reliance
Pond pump	7½	1,800	N.T.	Reliance
Air compressor for jig automatic controls	¼			
Lump-boom conveyor hoist	5	1,010	C	Shepard Niles
Egg-boom conveyor hoist	5	1,010	C	Shepard Niles
Stove-boom conveyor hoist	5	1,010	C	Shepard Niles
Stoker-boom conveyor hoist	5	1,010	C	Shepard Niles
Lump-track car retarder	15	1,800	N.T.	
Egg-track car retarder	15	1,800	N.T.	
Stove-track car retarder	15	1,800	N.T.	
Stoker-track car retarder	15	1,800	N.T.	
Carbon-track car retarder	15	1,800	N.T.	
Carbon-loading gate	1	1,800/100	H.T.	Reliance
Condensate pump	⅓	1,800	H.T.	
Heating-boiler stoker	2	1,800		
Oil-treatment circ. pump	2	1,200		
Oil unloading pump	3	1,200	N.T.	
Rock-bin reciprocating feeder	5	1,800/155	H.T.	Reliance

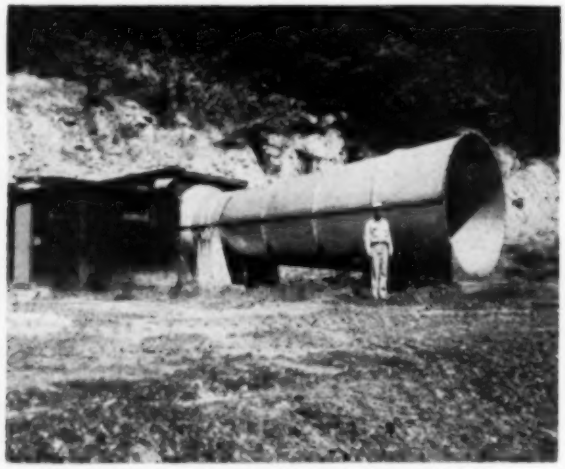
CARBON PLANT TO BE ADDED

At the time the plant was built, an excavation was made next to the hill ready for construction of the carbon-treating unit. This addition will con-

LOWER SEAM—Large-capacity units load into 5-ton shuttle cars where coal thickness ranges from 60 to 70 in.

UPPER SEAM—To produce from coal 32 to 42 in thick, machines only 24 in high load into 2½-ton shuttle cars.

Mines two Cedar Grove seams simultaneously



IN THE LOWER CEDAR GROVE SEAM, coal is cut with shortwalls (left) transported on crawler trucks. New 8-ft fan at the lower seam has more than enough capacity to handle fully developed mine.

sist of a Raymond flash drier using pulverized fuel and two R&S Super-Airflow tables, which will turn out a by-product coal of less than 6% ash. Its operation is included in the accompanying preparation-plant flow sheet (Fig. 1). Coal is dried before cleaning and the arrangement is the same as that of the company's highly successful carbon-treating plant recently built at Coal Mountain (*Coal Age,* June, 1952, pp 82-84, for detailed plant description).

MINE NOW DEVELOPING

Although presently turning out 2,500 tons of coal per 2-shift day, No. 17 mine is still in an early development stage. Mining is carried on simultaneously in the two Cedar Grove seams, which are separated by an interval of 50 to 82 ft. Under construction and scheduled for completion early in 1953 is a new portal for men and materials on U.S. Route 52, 7 mi by highway from the preparation plant and temporary portal. The bathhouse, lamphouse, mine foreman's office, shops and substation will be standard Armco Steelox Buildings. A commissary also will be built at the new portal. The existing bathhouse at the temporary portal will be retained for the preparation-plant crew. The 400 MSA Edison Model R4 cap lamps now kept at the tipple lamphouse will be transferred to the new lamphouse. At the new portal, a 170-ft 15-deg slope was sunk through the 50 ft of cover to the bottom seam and has been equipped with track and hoisting facilities.

CONTIGUOUS SEAMS WORKED

Coal in the upper seam is 32 to 42 in thick and in the lower seam 60 to 70 in thick. Mains and cross entries have seven headings and room entries have five. Rooms are driven 18 ft wide on 72-ft centers to a depth of 288 ft, with four crosscuts between pillars. Total mining will be carried on, and all workings in the two seams are to be columnized as far as possible, keeping top-seam development ahead 100 ft (inby). Pillars will be robbed on the advance throughout the mine. In this work, the pillar line in the top seam will be 100 ft ahead (outby) of the pillar line in the lower seam. Mining contiguous seams in this manner has been practiced for years at Red Jacket.

FIG. 3—TYPICAL WORKING PLAN and projections are shown in this section from the Upper Cedar Grove mine map. Development in the lower seam is columnized with that in the upper as far as possible.

TRACK HAULAGE UTILIZED

Track haulage (48-in gage) is used and mine cars are S-D Automatic drop-bottom units. Of these, 150 are 6-ton cars, 7 ft wide and 16 ft long, standing 32 in above the rail. Another 50 are 4-ton units, 7x12 ft by 30 in, employed for hauling slate and rock in both seams. New track installed in the lower seam consists of 60-lb rail with welded joints set on Osmose-treated ties. Haulage equipment includes two new 13-ton Jeffrey Type MH2324 locomotives, 30 in high and rated at 6,500-lb drawbar pull and 8.3 mph.

The 400-ton card-dump hopper has two tracks, one for each mine, and each is equipped with a Fairbanks scale and Printomatic weigher.

A new fan installed at the lower seam near the dump house is an 8-ft Jeffrey Aerodyne. It has a maximum rating of 1,160 rpm, 225 hp, 8.55-in water gage, but now is driven by a 40-hp General Electric motor and delivers 120,000 cfm at 1½ in. The fan has a Bristol pressure recorder.

BOTH SEAMS MECHANIZED

Production equipment for the upper seam consists of Joy 20-BU loaders and 2½-ton Joy Type 8-SC shuttle cars. In the lower seam, Goodman 660 loaders and 5-ton Joy 6-SC shuttle cars are used. It is intended to obtain the ultimate production from three Joy loaders and five Goodman loaders. At present, four Goodman units are in operation.

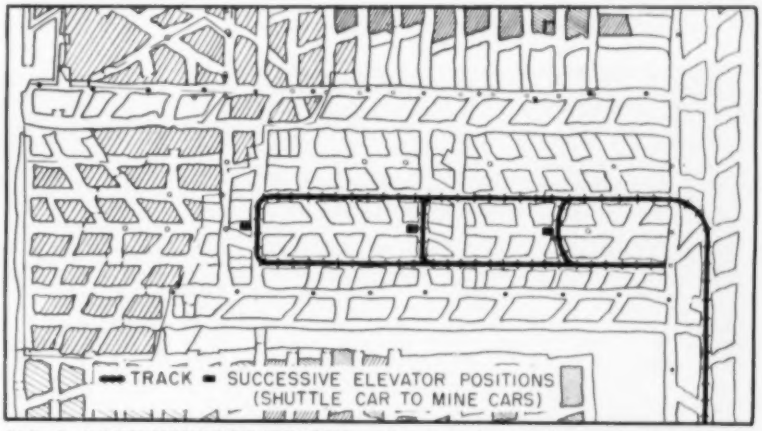


FIG. 4—LOOP HAULAGE TRACKS and successive positions of elevators by which shuttle cars transfer coal to mine cars.

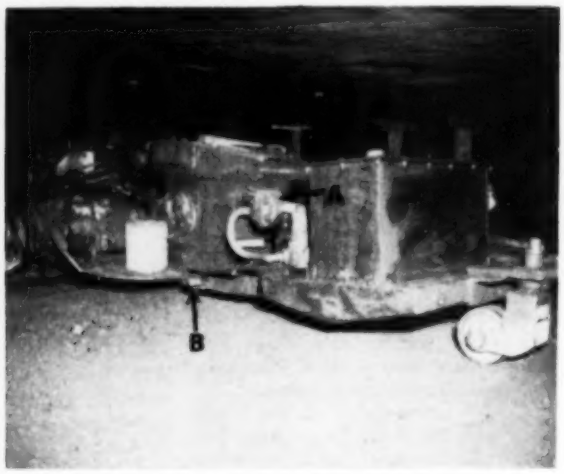
Joy elevators and Joy spotting hoists are installed. Coal is cut with Jeffrey 35L shortwalls transported on Joy T-2 trucks. Drilling is done with Chicago-Pneumatic No. 572 "Hi-speed" hand-held electric drills and shooting with du Pont permissible. Loop haulage, as in Fig. 4, serves the loading points.

Thus far, only a few pumps are required in the mine, and ditching is done where practical. Marlow self-priming centrifugals are employed for gathering, and the largest pump is a Weinman 6-in centrifugal unit. Plastic pipe is used in considerable quantities. At a station in the lower seam, three pumps are combined to provide a spare as well as a small pump for periods of minimum water (p 114).

A. F. Cook is superintendent for No. 17 and the other two mines at Red Jacket. J. F. Howell is assistant superintendent in charge of No. 17. Other engineering and operating officials, at the company's operating headquarters in Red Jacket, include: Roy A. Ison, assistant general manager; J. F. Maurice, chief engineer; C. H. Williams, assistant chief engineer; N. M. Long, resident engineer; C. P. Ferguson, preparation manager; I. M. Craig, preparation engineer; C. H. Price, chief electrical engineer; J. J. Plasky, training and safety director; and P. M. Farquharson, chief safety inspector.

CHALKING UP DIRECT SAVINGS of 10 to 15c a ton, new-type hydraulic coal drill offers advantages of light weight, speed, power, safety and ability to take it. Drill also plays major role in increasing coal realization.

RESERVOIR, pump and 5-hp motor are mounted on a semi-trailer attached to the crawler-type short-wall truck.



HYDRAULIC PUMP "A" is direct-connected to the motor. "B" is the hinge pin between semi-trailer and truck.

How Gay Coal & Coke Cuts Cost 10 to 15c by . . .

Hydraulic Drilling

Mounted on a trailer to accompany a nonhydraulic cutting machine, hand-held hydraulic drill effects substantial direct saving and contributes to increased realization as a result of revision in breaking methods.

Coal Age New Methods Report—1953 Series, No. 1

COMPLETING 3-in hole 7 ft deep in 30 sec, drill is powered by hydraulic pump on cutter truck through ¾-in hoses 50 ft long.

A HYDRAULIC COAL DRILL added to a non hydraulic shortwall cutting unit is effecting a 10c- to 15c-per-ton direct saving in drilling cost in No. 2 mine, Gay Coal & Coke Co., Mt. Gay, Logan County, W. Va. At the same time, it provides a necessary adjunct to a modernized shooting method which materially reduces fines and adds a neat figure to realization.

When Gay Coal & Coke Co. officials encountered a severe drilling problem with the revised shooting method, they turned their attention to the hydraulic drill being marketed by Schroeder Brothers, 3116 Penn Ave, Pittsburgh. Even though they had read that the drill was intended primarily for operation from existing hydraulic systems of cutting machines, roof drills and timbering machines, they saw that the possibilities warranted consideration of a portable hydraulic pump for the drill.

No. 2 mine recovers the 44-in Eagle seam, and cutting for mechanical loading is done with Jeffrey 35BB shortwalls transported from place to place on Joy T-2 crawler trucks. It was agreed that the logical place to mount the pump for the hydraulic drill was on the T-2 truck, but space was not available. The alternative, which has worked out well, was to mount the motor, pump and reservoir on a caster-type semi-trailer already on hand, having been developed some years ago by the coal company for carrying a motor-driven cable reel. Experience, however, had indicated that the cable reel could be dispensed with without appreciable drop in efficiency.

ANOTHER GAY FIRST

So far as is known, this application of the hydraulic coal drill to a non-hydraulic cutting machine is a "first," and in that respect the Gay Coal & Coke Co., a pioneer in mechanical mining, continues to run true to form. Harry S. Gay, vice president and general manager, and James S. Laird, general superintendent, explore every angle for maintaining profit in the face of higher wages.

Mr. Gay, a mining engineer, helped pioneer mechanical loading at Mt. Gay beginning in 1920. The company, under direction of his father Harry S. Gay Sr., also a mining engineer, shipped the first car of coal out of Logan County (1904). Mr. Gay Sr. left another mark in coal mining history in 1907 when, speaking before the Institute of Mining Engineers in London, he astonished the industry by predicting that some day coal would be mined mechanically.

The principal advantage of the hydraulic drill is that its speed and facility make it practical to have the mining machine operator and helper do both cutting and drilling. A 3-in by 7-ft hole for Airdox breaking is drilled in 30 sec even though this particular coal is hard to drill.

Freedom from mechanical shock if the auger stalls and freedom from the chance of electrical shock are safety advantages. Also, as compared to even a mounted electric drill, there is a further safety advantage in that the operators' hands are kept away from the auger. The light weight of the drill makes handling an easier job than with the hand-held electric drill. Maintenance is expected to be considerably lower than with the electric drill.

The Schroeder Brothers pump is driven by a Reliance 5-hp 275-v motor, and the oil reservoir, serving also as a radiator, has a capacity of 27 gal. Operating pressure is adjusted to 1,500 psi. Connections between pump and drill consist of a pair of ¾-in hoses 50 ft long.

TRUCK PULLS TRAILER

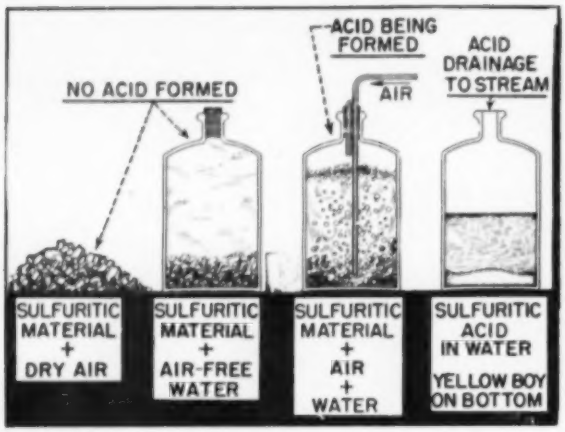
The semi-trailer on which the unit is mounted is connected to the T-2 truck by two hinges 20 in apart which permit only an up-and-down motion. The back end is carried on a center caster or dolly built around a 7-in-diameter steel wheel with a 5-in face. Except for the additional length, maneuverability of the T-2 truck is not affected.

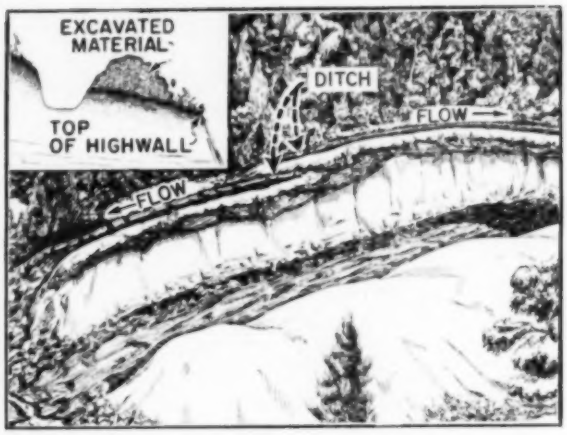
Installation of Airdox cut the direct breaking cost in half and reduced the output of ¾x0 from 34 to 23%. With the original electric drilling, however, the greater number of larger-sized holes greatly increased the drilling cost. Eight holes are drilled per cut in rooms 25 ft wide.

The hydraulic unit solved the drilling problem for Airdox and at the same time cut the drilling cost far below what it had been when using permissible explosive. A second hydraulic unit is now being assembled on another T-2 trailer truck to displace a mounted electric drill used in another section in the mine.

Kennametal bits are used on the auger of the hydraulic drill. As a rule a set is used one shift and then removed for regrinding. As an average, the crew cuts 9 places per shift and drills a total of 72 holes.

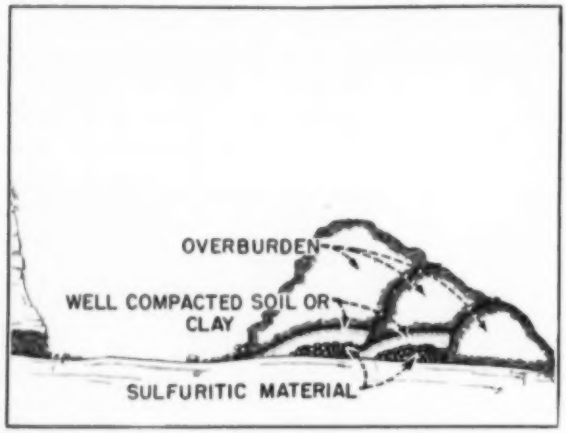
No. 2 mine output is 1,200 tons per day of two operating shifts. Shuttle cars deliver to mine cars via elevators. To get maximum loading of cars without spillage as a result of dragging against low top, the cars are leveled by a motor-driven leveling device developed and built at the Gay Coal & Coke Co. shop and described in *Coal Age*, February 1947.

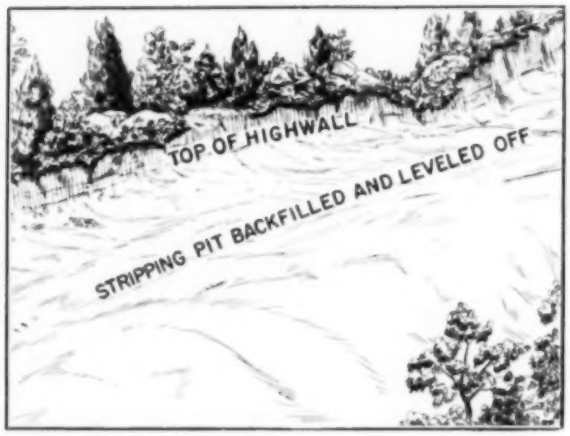




WITHOUT BOTH air and water, there is no acid . . . **SO USE** drainage ditch above highwall to help keep pit dry.

How to Avoid Stream Pollution





COVERING acid-forming refuse properly is essential . . . **COMPLETED STRIP PIT,** after backfilling and leveling.

You can't neutralize acid drainage as it comes from a mine, but by the proper methods you can readily prevent its formation and flow. Here are the step-by-step recommendations of the Pennsylvania authorities.

NO PRACTICAL METHOD has yet been discovered for removing the polluting effect of acid in coal-mine drainage once the acid has been formed. There are, however, several feasible and comparatively simple steps that can be taken to prevent or reduce the "making" of acid at both strip and deep mines, with the elimination or major reduction of stream pollution from mine drainage as a result.

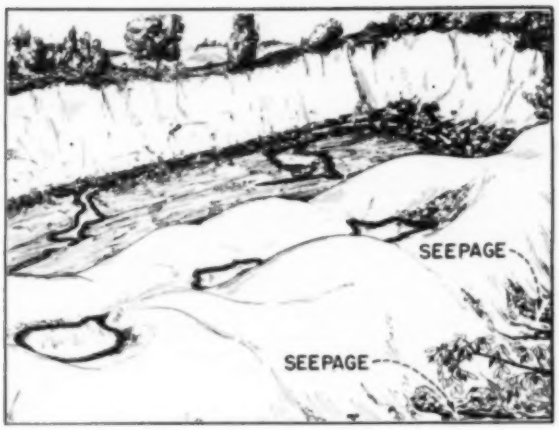
That is the conclusion of the Sanitary Water Board of the Pennsylvania Department of Health, Box 90, Harrisburg, Pa., based on its experience in administering the state's law for stream-pollution control and its experimental studies and research into the problem. The following analysis of the factors involved and recommendations suggested are taken from "Control of Acid Drainage from Coal Mines," a newly published booklet available from the Board.

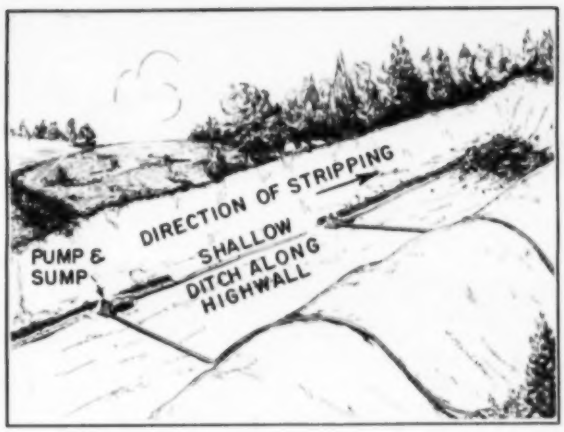
HOW MINE ACID FORMS

The basic objective in preventing or reducing acid formation in coal mines is to keep air and water out of contact with sulfur-bearing materials. Coal seams and adjacent strata contain sulfur in various forms which, in the process of mining, are uncovered and exposed to air and moisture. When so combined with air and moisture, sulfuritic materials oxidize to produce acid-forming substances, which then form sulfuric acid in the water draining out of the mine and deposit oxides of iron, or "yellow boy," on the stream bottom. If sufficient acid is present, the stream becomes a "mine-acid stream"—unfit for use as a home or industrial water supply or for fishing or swimming.

Control methods are based on one primary fact: Sulfur-bearing materials cannot form acid without the presence of air and water. Keep them apart and you have no problem.

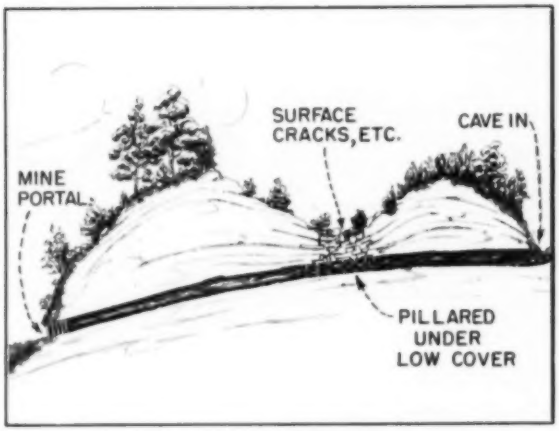
As it enters a mine, water is almost

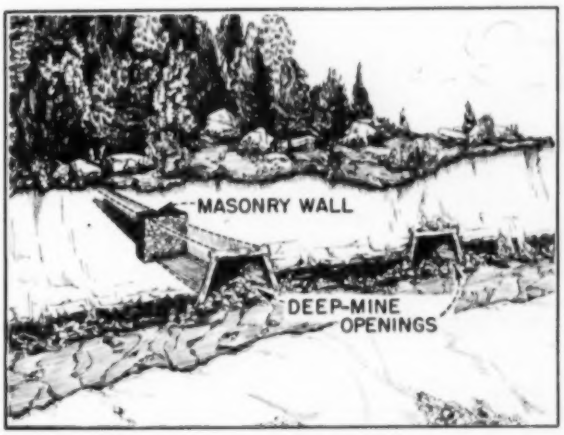




POOLS collecting in a strip pit generate acid drainage . . . **SO HAVE** ditches and piping remove water quickly.

From Acid Mine Drainage





AIR AND WATER have many entrances into shallow mines . . . **BLOCK OFF** openings between deep and strip mines.

always acid-free. Once in an operation, however, it picks up whatever acid substances have been previously formed on the coal faces and associated measures and at the same time also leaches out still more acid.

The major factors affecting acid formation are: (1) The quantity and character of the sulfur-bearing material present; (2) the degree to which it is broken up and fresh surfaces exposed; (3) the length of exposure to air and moisture; and (4) the presence of flowing water to remove the previously formed acid substances. Except for the first, the quantity and character of sulfuritic materials present, all these factors can, to some degree, be controlled.

FOUR BASIC STEPS

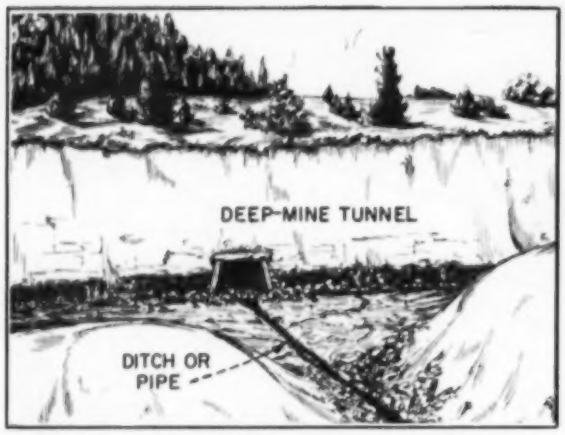
In either strip or deep mining, there are four methods of keeping the three acid-producing elements apart:

1. Keep Water Out—Perhaps the most practical and effective means of preventing acid formation is to keep water out of the workings. The common notion that acid in the discharge is greater when the flow from the mine is low has been disproved by careful studies over several years. Actually, the percentage of acid is almost the same, whether the flow of water from a mine is large or small. Consequently, a much greater quantity of acid is discharged during periods of high flow. Thus, it is most important to cut off every source of water entering a mine.

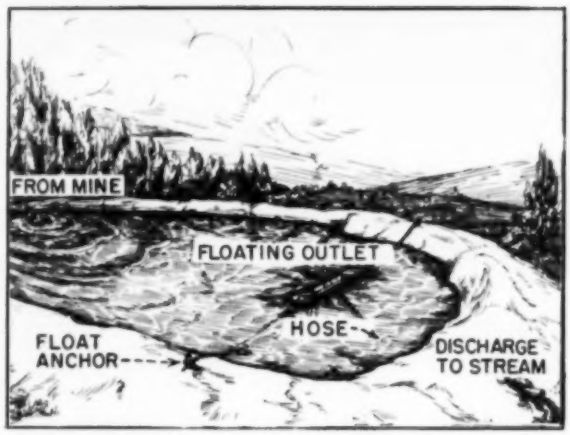
2. Keep Drainage Moving—Water that does get into the workings should be kept moving out of the mine as rapidly and continuously as possible, either by natural flow or pumping. Water should not be permitted to collect in pools or ditches, since the longer it remains in contact with the sulfuritic materials, the more acid it will make.

3. Segregate Sulfuritic Materials—Minimize by every means possible the quantity of acid-forming materials left exposed to air and moisture, as well as the period of such exposure. Maximum segregation from air and moisture is essential for the coal seam, spoil and refuse.

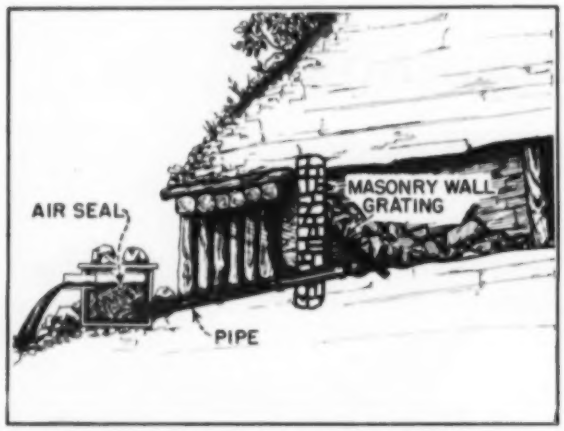
In this connection, blossom, rider, rooster or other coal-mine refuse should not be used in building or repairing roads, a practice which often results in stream pollution. Rainwater soaking into such materials leaches out the acid previously formed by air and moisture and then trickles its way to a nearby stream. Similarly, spoil banks and gob piles also are responsible at times for stream pollution.



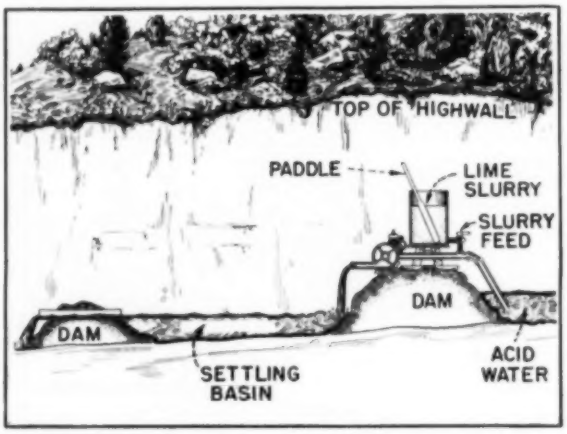
DITCH deep-mine drainage through a stripping cut.



HOLDING LAGOON provides constant flow from deep mine.



"WET-OPENING" SEAL keeps air from entering mine.



METHOD of neutralizing a standing pool with lime.

However, water seeping through "red dog" from burned-out gob piles does not produce the harmful effect on a stream as that from unburned sulfuritic material.

4. Neutralize Casual Acid Pools—In spite of every precaution, some water will collect in pools on the mine floor or in sumps where, if it remains, it will be in contact with sulfur-bearing coal and sulfuritic refuse and become acid. Although it is agreed that there is no feasible or effective means of neutralizing acid water flowing from a mine, it is often practicable to neutralize a standing pool before the water is discharged to a nearby stream.

Preventing Strip-Mine Pollution

DIVERT SURFACE WATER

Surface water can, to a considerable extent, be kept out of a strip pit by providing one or more drainage ditches along the bank above the highwall. The ditches should be constructed and maintained to catch any surface runoff from rain or melting snow that may flow down the slope toward the pit, carrying the water thus collected around the pit to a discharge outside the operation. With a highwall diversion ditch, the floor of an open pit also will remain drier and, therefore, a better place to work.

This practice has proved to be so effective in minimizing acid discharge that the Pennsylvania Sanitary Water Board regulations now require that all strip mines hereafter opened or reopened shall provide drainage ditches above the entire length of the highwall so constructed and maintained as to prevent surface water from flowing into the pit.

ELIMINATE UNDERGROUND WATER

Underground water from seepage or springs should be collected at its source in a sump and piped to a discharge outside the stripping area. Likewise, if old underground workings are broken into, drainage should either be blocked off or piped through the stripping.

AVOID STREAM CROSSINGS

If a stream or watercourse is encountered during stripping, the water should be prevented from entering the stripping cut. When the land contour permits, the stream may be diverted in a tight ditch around the cut. Otherwise, it may be necessary to pipe the water to flow across or through the stripping.

Another solution is to "hedge hop" the watercourse by stopping the stripping cut before reaching the stream bed and again proceeding beyond the far side of the stream, which thus continues to flow in its natural and undisturbed channel.

PREVENT FORMATION OF POOLS

If water is permitted to collect in pools on the pit floor or on spoil banks, acid will have an oportunity

to form. Spoil piles should, therefore, be graded so that the surface water will run off rapidly and not collect in pools and soak in.

FLOOR DITCHES AND DRAINS

To prevent collection of water on the pit floor in contact with sulfur-bearing refuse, drainage ditches and, if necessary, pumps should be provided, with the drainage discharged through or over the top of the spoil banks. Keeping the floor dry also makes better working conditions for men and machines.

The more quickly water is conducted through the mine to the gathering points and from the gathering points to the discharge point, and the less it comes in contact with gob and other sulfuritic materials, the less will be the total acid discharged.

KEEP THE FLOOR CLEAR

Waste coal, carbonaceous shale, partings or other sulfur-bearing material should not be permitted to accumulate on the floor of the stripping where it can be ground fine by trucks or other equipment. When finely ground, the material exposes many more faces of the sulfur-bearing particles to oxidation, thus resulting in the formation of more acid from the same material. Where coal is being stripped or has been stripped, the floor should be kept clear by pushing refuse to one side of the cut.

BURY ACID-FORMING REFUSE

Strip mining of coal produces three products: clean spoil, sulfur-bearing refuse and marketable coal. To prevent formation of acid within the mining area, the sulfur-bearing materials, including rider, rooster, blossom and bony coal, as well as carbonaceous shale, partings and similar acid-forming wastes, should be placed to one side at the time of excavation and kept separate from the clean spoil. After the marketable coal has been removed, the sulfuritic refuse should be spread evenly along the bottom of the pit at the base of the spoil pile. The acid-making materials should then be covered over with a thick layer of clay or other clean soil packed tightly by running over it with a bulldozer or similar heavy equipment. The backfilling can later be done with the loose, clean material from the highwall, as it is wasted as spoil on the lowwall side of the cut.

DON'T LEAVE COAL EXPOSED

Uncovering coal and allowing it to lie exposed for some time before removal encourages acid formation and should be avoided. If for any reason it becomes necessary to remove the cover ahead of time, leave a layer of undisturbed overburden not less than 2 ft thick in place on top of any carbonaceous shale, rider coal or coal measure until just before the time comes to take out the coal.

BACKFILLING REQUIRED

Under no circumstances should the last cut of a stripping operation be left open with acid-forming refuse exposed to air and moisture. Upon completion of coal removal, the pit should be completely backfilled and the spoil banks leveled off and graded to shed water as described below. Wherever floor drainage has been provided, the drains should be removed or permanently plugged at the time the final backfilling is done.

The Pennsylvania laws, as administered by the Department of Mines and the Department of Forests and Waters, require that within a stated time after mining is completed, open-pit mines shall be backfilled, leveled and replanted in a specified manner. Among other things, the law says that the backfill shall cover the exposed face of the unmined coal to a depth of at least 3 ft for bituminous and, under certain circumstances, 5 ft for anthracite open-pit operations. This method of backfilling, months after mining is completed, permits the eventual replanting of the area, but unfortunately does not prevent water from collecting in the cut and finding its way to acid-forming refuse which may be in or under the fill. An acid discharge from the abandoned operation to a stream frequently results.

Now under trial in a number of strippings, the Sanitary Water Board's experimental regulations to reduce acid discharge require that: (1) Backfilling shall follow closely behind coal removal; (2) sulfur-bearing refuse shall be buried on the pit bottom under a layer of compacted soil; (3) backfill materials shall consist of clean spoil free of acid-forming refuse or similar wastes; (4) backfill shall extend to the top of the highwall and conform to the original contour, as far as practical; and (5) the top surface of the fill and spoil banks shall be graded so that rainwater will run off rapidly.

AUGER-MINING VARIATIONS

Any drainage resulting from auger-mining operations normally will flow into the strip pit and should be disposed of as described for other water flow. Upon completion of mining, the operator is required, by a regulation of the Pennsylvania Department of Mines, to pack the holes made in the highwall with incombustible material for a minimum depth equal to the diameter of the hole and thereafter restore and plant the area as required for strip mines.

Controlling Deep-Mine Flow

WHERE WATER COMES FROM

As with stripping operations, the most effective means of minimizing acid drainage from underground mines is to keep water out. Water enters from surface seepage through the soil and rock cover, through coal outcroppings, crevices and cracks in the overburden, through pit holes scattered over the mining area, and also from underground flows.

Water entering mining areas underground is almost always free from acidity. It becomes acid only after contact with the roof, ribs, face or floor of the mine. The fact that water discharged from deep mines increases in rainy weather and decreases in dry weather shows the close relationship between surface water and mine discharge. In wet weather, mines with shallow cover generally increase their drainage volume more quickly than mines with thick cover.

Sealing cracks and crevices and filling pit holes in the earth over active shallow-cover mines is important in preventing the entrance of water and, thereby minimizing the production of acid. While it is sometimes difficult to prevent surface water from entering through breaks and porous spots in the cover, nevertheless, all reasonable steps should be taken to keep water out.

SEALING OPENING BETWEEN STRIP AND DEEP MINES

During stripping, nearby deep-mine workings are frequently broken into. When this occurs, water in the strip cut may flow into the deep workings and thus increase the rate and quantity of discharge from the deep mine, or drainage from the deep mine may flow into and through the stripping pit and out to the receiving stream. Either may result in the discharge of additional acid water. To guard against a breakthrough from one mine into another, steps should be taken to provide an effective barrier between.

If it is impractical to stop water flow from a deep mine into a strip pit because of breakthroughs or seepage, then the discharge from the deep mine should be piped through the stripping in a water-tight ditch or

How the Pennsylvania Water Board Works

In Pennsylvania, as in many other states, continually expanding population and increasing industrial output present a two-pronged problem in water supply: a mounting demand for more clean water, accompanied by a steady rise in the dumping of human and industrial drainage.

To meet this situation, the state has enacted laws to control the pollution of its waters, including their pollution by acid mine drainage. Enforcement is vested in a 7-man Sanitary Water Board in the Department of Health, with the Secretary of Health serving as chairman. The law requires that before any new coal mine is opened, an old mine re-opened or a change made in an approved drainage plan, the operator must first secure a drainage permit from the Board. The law also prohibits the discharge of acid water to clean streams.

Before acting upon an application for a mine drainage permit the Board considers all the facts available, including its own extensive investigation of the case. Its object is to permit the mining of the coal if the streams can be properly protected from acid mine drainage.

To support and encourage the mining of coal, the Board has spent more time and money investigating ways of reducing mine-acid stream pollution than on all other waste studies combined. With its own staff and through other agencies, the board has conducted investigations and research into sealing abandoned deep mines, backfilling and planting of abandoned strippings and the underlying causes of acid formation and its prevention, together with acid-reducing experiments at actual strip mines through the cooperation of a number of operators.

The Sanitary Water Board fully realizes that any method adopted for minimizing acid formation must be practical from an operating standpoint and not unreasonable in cost. It welcomes inquiries from mine operators as to the law's requirements, as well as their voluntary participation in its program.

drain and discharged outside the operation. Water will thus be prevented from accumulating in the active stripping pit or collecting at a point where it can seep through the spoil banks.

REMOVE OBSTRUCTIONS

Obstruction to the free flow of water in a mine causes water to back up and come in contact with more coal and refuse materials. Slowing down the flow also prolongs the time the water remains in contact with the mine surfaces and loose materials on the floor. Ditches and drainage lines should, therefore, be installed and kept clear, and every reasonable effort made to keep the drainage moving.

SPREAD THE HOURS OF DRAINAGE DISCHARGE

Many deep mines pump their drainage from underground sumps to one or more discharge points on the surface. Water entering a mine usually flows in, day and night, at a fairly uniform rate. On the other hand, the sump water is often pumped out at a high rate during a few hours to take advantage of off-peak power rates and to effect other operating economies. It should not be overlooked that in the interval between pumping periods water rises in the mine and comes in contact with a greater surface area, thus leaching out more acid.

Complete pumping of drainage into a stream during short periods may build up a dangerous acid concentration and result in sending a slug of acid down stream with a piston-like effect. The acid is likely to be sufficient to kill fish or actually ruin a stream. Yet, if the same quantity of acid were discharged uniformly over the 24-hr day, its injurious effect upon the stream is almost certain to be greatly lessened.

The economy of off-peak pumping, together with the benefit of uniform discharge to the receiving stream, can both be obtained by providing a surface lagoon outside the mine with a capacity sufficient to handle the 24-hr drainage. Pumping from the mine into the holding basin may then be done at any time or at any rate. Meanwhile, the water in the lagoon is fed by gravity into the stream day and night at a steady flow.

Lagoons may readily be excavated and equipped with a simple draw-off through a constant-head floating outlet which rises and falls with the water level in the lagoon. One form of a constant-flow outlet is shown discharging water through an acid-resistant plastic hose in an accompanying illustration.

With a lagoon of this type, acid concentrations in the receiving stream will be greatly reduced and some of the oxidized iron will settle out in the lagoon instead of in the stream. For example, a mine feeding its wastes from a lagoon to the receiving stream at a steady rate during a 24-hr day, would discharge an acid concentration into the stream only one-sixth as large as if it were pumping the same drainage into the stream in 4 hr.

If during excessively wet seasons it becomes necessary for a mine to continue pumping through most of the 24-hr period, the equalizing lagoon will have little or no effect on the rate of discharge to the stream. However, at such periods of high mine flow, the stream flow also is high, with the result that the stream is better able to absorb the wastes delivered by continuous pumping. It follows that a uniform rate of discharge over the 24-hr day will help the streams most during low flow seasons when receiving streams are at their highest degree of acidity and need protection most. Likewise, a uniform rate will have the least effect during high flow seasons, when streams receiving pumped drainage have the lowest degree of acidity and the least need of protection.

Spreading the discharge of acid drainage over 24 hr is probably the simplest known means of reducing the concentration of pollution from active deep mines. The widespread practice of this form of drainage control would result in a major improvement in the condition of many of our streams.

OTHER CONTROL MEASURES

The removal of accumulated water from gathering points to a main sump at frequent intervals is helpful, because it prevents prolonged contact of water with refuse material and keeps the pools shallow and small in area.

ROCK-DUSTING ACTIVE MINES

In active deep mines one practice, while not employed primarily for minimizing acid formation, nevertheless does, to some extent, reduce the making of acid. This is rock-dusting. Rock-dusting to a limited degree serves to neutralize acid substances formed on interior surfaces and also acts as a coating which temporarily slows down the rate of acid formation on the dusted areas.

To whatever extent dusting with limestone is used, some reduction in acid formation may be anticipated, but only during the period of its use.

FLOODING ABANDONED DEEP MINES

Many deep mines, while operating, depend upon pumping to keep the water level down. When such a mine is abandoned, future acid formation may often be prevented by permitting the operation to flood completely, with water thus keeping air out of contact with sulfuritic materials. Flooding is effective, however, only when conditions permit the entire mined-out area to be permanently submerged. If any part of the worked-out area containing sulfuritic materials is above the water line and, therefore, exposed to air, acid will continue to form and drainage from these sections will carry acid water into the pool and may result in an acid discharge to the stream.

When a mine is filled with water and begins to discharge from the collar of the shaft or other outlet, the discharge at first may be acid as a result of the acid-forming materials the water has absorbed. However, in the absence of air, acid formation stops and the flowing water soon becomes alkaline. In a number of cases, water from a permanently flooded mine is used as public water.

SEALING ABANDONED MINES

Another way of reducing acid formation in abandoned deep mines is preventing the entrance of air by sealing. The effectiveness of this method depends on how completely the entrance of air from every outside source can be stopped.

The process of sealing involves closing all openings through which air can find its way and includes such things as stoppings or water traps at mine entrances and filling of surface breaks and porous areas in the cover to prevent the entry of both air and surface water. The effective sealing of shallow-cover mines is obviously more difficult than with mines with a thick cover of, say, 100 ft or more. In Pennsylvania, the Department of Mines is carrying out a wide-spread program of sealing long abandoned mines.

Neutralizing Standing Pools

FLOWING WATER CANNOT BE NEUTRALIZED

Both laboratory and field experiments thus far have shown that neutralization of acid water flowing from a coal mine is not practicable either from an operational or cost standpoint. The Mellon Institute of Industrial Research, for example, made a thorough study of the subject under a Sanitary Water Board fellowship. While the Mellon Institute found neutralization of flowing water neither "practical or feasible," it does state that casual pools of acid water standing in a mine can be neutralized before discharged to a stream, if done properly. Details of its findings are contained in a booklet available from the Board.

EFFECTIVE NEUTRALIZATION

There are right and wrong ways of neutralizing acid water standing in a pool. One wrong way is to dump in or spread limestone or powdered lime over the surface of the pool. When thus applied, the grains of alkali quickly become coated over with substances that stop further neutralization. The particles also settle to the bottom where they do little good in correcting acidity.

Sluicing mine drainage over crushed limestone in any form also is ineffective because the surfaces of the stones, when covered with acid water, quickly coat over with chemical products and neutralization ceases.

One practical method of neutralizing acid water in a standing pool is to apply a slurry of hydrated lime. The first, and essential step in this or any other method, is to find out how much acid there is to be neutralized.

FIRST ANALYZE WATER

To determine the quantity of acid to be neutralized, the pool water must be analyzed by a chemist. For a representative sample, collect water from a number of points in the pool and mix them together. Fill a clean pint bottle with the mixed water, cork it, label it and ship it to a chemical testing laboratory for analysis. Ask the laboratory to make an analysis for total acidity by a method approved by the Pennsylvania Sanitary Water Board. Laboratories are located in all of the larger cities of the state. The analysis received will give the degree of acidity of the pool water in parts per million (ppm).

Both acid and alkaline pools may be found in the same mine. Thus, each pool should be separately sampled and analyzed so that if alkaline water is found it can be used to help neutralize any pools proved to contain acid.

DETERMINE LIME REQUIRED

In addition to finding out by chemical analysis the concentration of acid present in the water, it is necessary to know the quantity of water in the pool. The estimated contents of the pool in thousands of gallons multiplied by the pounds of lime necessary to neutralize the acidity in 1,000 gal, as shown in the following table, will determine the total lime needed.

Lime Required To Neutralize 1,000 Gal of Acid Mine Water

Total Acid, Parts per Million	Pounds Acid in 1,000 Gal	Pounds 90% Hydrated Lime per 1,000 gal
ppm	To nearest 0.05 lb	Theoretical Total, plus about 15%
100	0.85	0.5
200	1.65	1.6
300	2.50	2.4
400	3.30	3.2
500	4.15	4.0
1,000	8.35	8.0
1,500	12.50	12.0
2,000	16.65	16.1
2,500	20.80	20.1
3,000	25.00	24.1
3,500	30.00	28.2
4,000	33.30	32.2

While it is important to use sufficient lime to neutralize the acidity completely, it is equally important not to permit an overdose, because an excess produces a caustic water which, like acid water, will cause stream damage.

APPLYING LIME SLURRY

As previously stated, powdered lime should not be added directly to the pool. The lime should first be made into a slurry by mixing it with water. Then the well stirred slurry is fed slowly into the suction line of a pump at such a rate that the required quantity of lime is fed into each 1,000 gal of water as it passes through the pump. An electric-or engine-driven centrifugal pump is the best type.

TESTING NEUTRALIZED WATER

After all the slurry has been added, the pool should be permitted to stand until the iron has settled out and then tested. Pool water should not be discharged to the stream until it is found to be neither harmfully acid nor caustic.

Since, as outlined above, acid drainage flowing from a mine cannot be successfully treated, the neutralization process here described should be applied only to standing pools.

It is also to be remembered, Pennsylvania State authorities point out, that it is the operator's responsibility to see that water discharged to a stream is neither harmfully acid or caustic and that it carries no iron which has not been settled out.

Training Supervisors—for What?

By B. B. LUCAS JR., Instructor, Mining Extension
West Virginia University School of Mines

To get the most out of training, know your objectives and proceed accordingly. Meeting an immediate need or developing better management for the long run determines the type of training required.

"DO YOU NEED supervisory training?" That was a routine question recently put to a mine superintendent. "Always," was his reply. But when we got to specific objectives, he was not quite so definite. Isn't that characteristic of many of us today? We have been sold on the idea of training, but we've neglected to analyze our specific needs before we call on a training agency.

The fact is that in every instance a training program should be designed to serve *a local need,* regardless of who makes the training decision or who provides the training, be it company or outside agency. "But," you say "all training is good for the supervisor; it can't do any harm." Again the fact is that the wrong program can do a great deal of harm to the supervisor and to the company. Furthermore, many programs are time-consuming and costly. Required attendance in one program may discourage attendance and interest in future programs.

There is no argument against providing supervisory training on idle days except that required attendance in repetitious courses merely for the sake of keeping supervisors occupied may dampen interest in a future program designed to meet a genuine need. Why not use this training time profitably by knowing what your specific training needs are rather than relying on the hit-or-miss process of trial and error?

Systematic determination of supervisory training needs is not a simple matter. Neither is it so complex that we must call in an "expert" to tell us what we need. Basically, the decision should advance definite managerial objectives, and these objectives should be either for the immediate future or the long run. Thus, if training is considered both in the light of immediate and pressing situations, and in definite long-range planning, we have some basis for making a rational decision on a training program.

Remedial Training

What kind of training is needed as a *remedy* for an existing condition? The answer depends upon the local situation. Some of the areas for remedial training include "quickie" courses for new supervisors, courses to aid the supervisor in meeting statutory requirements, conferences on employee relations to relieve a delicate labor-relations situation, instruction in the use of new equipment, introduction to and indoctrination in new mining laws and company policies, and correction of substandard safety practices.

It is apparent that in each instance the need for training is immediate and pressing. Thus, the objective of training in the short run is to increase production, reduce cost or improve safety conditions and practices. Systematic observation of individuals and study of company records will reveal how well production schedules are met, if costs are excessive and if conditions are below par in safety, waste labor turnover, grievance adjustment and morale in general.

Take, for example, the matter of labor relations. You may be confronted with disturbances but may be unable to locate the trouble. One successful way to correct this

situation is to keep a record of all grievances, large or small, adjusted and unadjusted. At the end of a given period, say every 3 mo, tabulate them and classify them under such headings as overtime, transfers, layoffs, promotions, favoritism and so on. You may be suprised to learn that complaints tend to bunch around one or two causes. It then becomes a relatively simple matter to prevent many future difficulties by supervisory training dealing with the *cause*.

Or the superintendent may wonder why he and the mine foreman are spending so much time adjusting grievances themselves, meaning that the grievances are by-passing the section foremen. Through interviewing both supervisors and employees he may learn that the foremen may not possess the necessary skills in adjusting complaints to the satisfaction of the workers, or that the section foremen are simply passing the buck because they do not know what their exact authority is. A training program designed to remedy this situation would take the form of conferences to discuss company policy, relations between different levels of management, and practice in adjusting grievances.

Training for Development

Long-range training objectives usually are associated with improvement of managerial efficiency through the personal development of individuals in the management ranks. The main objective of a management-development program is providing a continuous supply of well-qualified supervisors who are prepared to step into positions of greater responsibility when these positions become vacant, or into new positions created because of changes in mining methods or expansion of the business. You are considering the company's needs in terms of the leadership it will require at some future date. Therefore, the selection of a training program for this purpose is quite different from building a program for immediate needs.

It is difficult if not impossible for a single person to determine the company's needs in a management-development program. A sound decision is more likely to be reached through a training steering committee composed of responsible people with time to consider issues and decide on policy. But even before the committee can decide on a program, *it must first determine the needs.*

The popular scheme for making this determination is referred to as "management inventory and review." It operates along these lines:

1. Each person in a managerial capacity writes a description of his duties and responsibilities, explicitly defining the extent of his authority.

2. The existing organizational chart is examined for positions likely to become vacant as a result of retirement, transfer or other reason.

3. The qualifications of existing candidates for positions which may become vacant are compared with the job descriptions derived through Step 1. Here is your first problem: Are the candidates for the positions qualified, and if not, what training do they need to prepare them for the added responsibilities of the new positions?

4. A replacement chart for the existing organizational chart is made up. Each position and its present holder is listed, along with the most-likely candidate should the position become vacant. For each candidate, a determination is made of the gap that exists between his personal qualifications and those required for the job. Training must then be selected to fill the gaps.

To evaluate the qualifications of candidates—it is assumed that all supervisors are candidates for promotion—many companies use some form of periodic personnel review. The review board operates from the top down to the bottom of the management scale. At set intervals, usually semiannually, each management member is studied by a committee of three superiors in an ascending line of authority over the individual being reviewed. The section foreman, for example, is reviewed by a committee consisting of the mine foreman, superintendent and, possibly, safety director. The mine foreman is reviewed by the superintendent, chief engineer and manager—and so on up through all positions in question.

To guide the review committee, a standard set of questions is devised so that each candidate is considered on the same basis. In evaluating a candidate, the committee may consider these factors: leadership, managerial abilities, safety practices, mental qualifications, cooperation, creative ability, emotions, physical condition and others.

After a decision has been reached by the committee the man under review has another conference with his immediate superior, who discusses the review with him He is asked to appraise himself on a blank copy of the guide sheet and his ideas are compared with the committee's findings. The man reviewed can request training or anything else that he thinks will strengthen his weak points. What he asks for usually coincides with the committee's recommendations.

The Appraisal Goal

While the review committee is expected to determine accurately the outstanding abilities and qualifications of the individual under study, it should also attempt to identify those abilities and qualifications that may need development. Committee members must define the nature, scope and type of personal development which the individual requires. Unamimous agreement of the group must be had in making final recommendations.

In evaluating the individual, the committee must consider several important questions. What is the next step in his line of promotion? Is he ready for it, or is he promotable? What other jobs would he be considered for? Is further training and experience necessary? Should he be left in his present job, placed on probation, replaced, demoted, transferred or terminated?

The periodic review aims at these results:

1. Evaluation of the performance and potentialities of each management member.

2. Recognition and correction of each weakness through discussion, special training and personal development.

3. Discovery of old and new talent for special development. Such an undertaking may seem complicated and time-consuming, but the results are worth the effort. Training needs are pinpointed and each supervisor knows where he stands.

If you look upon your supervisors as potential managers, your training decisions will begin to take definite form. Your choice of programs will be influenced by the emphasis you place upon the art of management.

If you feel that our technological advances have outrun our ability to manage, your program will be one of providing the organization with the constant supply of management personnel who are able to coordinate the production team of men and machines. Your faith in the future of the industry and in your company will inspire supervisors to want to participate in a management-development program.

A continuous program of management development, whether or not many promotions are necessary, is bound to improve managerial efficiency. On what sounder objectives could training decisions be based?

How to Build a Dust-Control Program . . . *And how to keep it working*

KARL T. MILLER, The Hudson Coal Co.
"Effective dust control demands a double-barreled approach—through engineering and education."

"By far the most terrible form of emaciation is that which the Greeks call phthisis. It spreads to the lungs. On top of this, ulceration occurs and a slow fever which at times disappears and at other times reappears." Celsus, a Roman writer of the first century, made this statement in a discourse on miners' diseases.

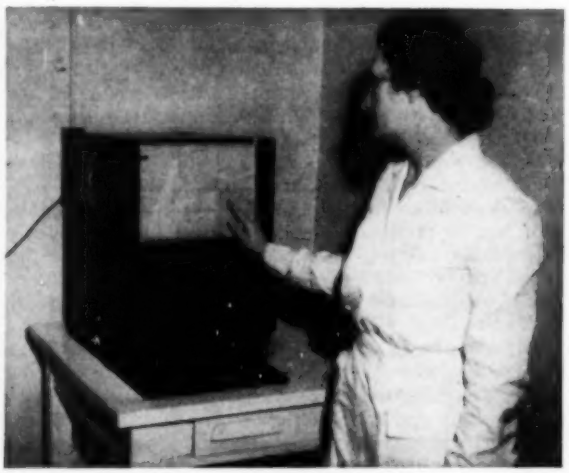
Georgius Agricola, who was born a scant two years after America was discovered, in his De Re Metallica described mining as "a perilous occupation to pursue because the miners are sometimes killed by the pestilential air which they breathe; sometimes their lungs rot away."

Celsus and Agricola remind us that diseases resulting from the inhalation of harmful dusts are as old as Man's interest in Nature's buried treasures. Defenses against the ravages of dust have been sought and adopted throughout these long ages. In fact, Pliny, the Elder, pointed out that "minium refiners in the factory envelop their faces with loose bladders, which enable them to see without inhaling the fatal dust."

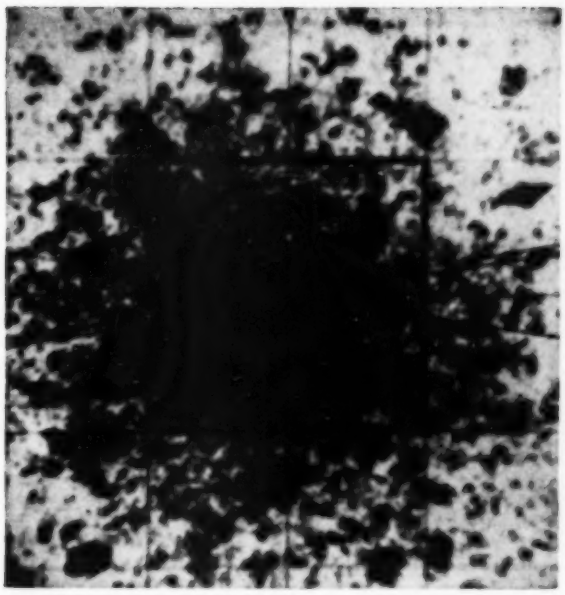
As long ago as the 17th Century the medical world had developed means for studying sections of the diseased lungs of victims, but a sure cure eluded the searchers.

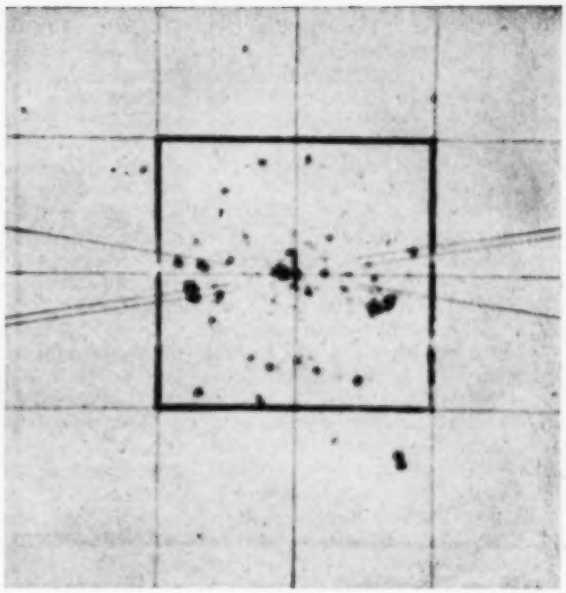
In our time, phthisis becomes synonymous with silicosis, and although final answers still are elusive, progress is being made.

What follows is the story of one coal company's efforts to prevent the occurrence of dust-caused diseases. It is the story of how The Hudson Coal Co., Scranton, Pa., anthracite's pioneer in this matter, goes about the job of controlling dust.



DOROTHY C. HAHN, laboratory technician, demonstrates how dust samples are magnified and counted on the microprojector in Hudson Coal's well-equipped laboratory





DUST-CONTROL MEASURES can be effective! Once you convince the workmen that working places don't have to be dusty, they'll not return to the old way. These slides show relative concentrations under dry drilling (left) and wet drilling (right). Particle counts are at least 400 million per cu ft (left) and fewer than 6 million (right).

SILICEOUS DUSTS are hazardous to health. This is a fact you will have to face up to. It presages the overriding need for effective dust-control measures. But having recognized the problem, where do you go from there? What is your first move? Then, how do you flesh out a dust-control program and keep it virile?

Perhaps you will find the answers in experiences of The Hudson Coal Co., as related by Karl T. Miller, safety engineer.

Mr. Miller points out that anthracite occurs in a number of seams, as many as nine being mined simultaneously at some collieries. Furthermore, a grievous water problem exists. These two factors make necessary a number of haulage and drainage tunnels through the rock intervals between the coal seams and a number of large pumping stations hewn in the solid rock. A company rock force works these projects at all collieries over Hudson's 40-mi-long area of operations, and in 1925 the rock force was equipped with tools for wet drilling.

CLINICAL TESTS expedite diagnosis of employee complaints.

As time passed, it became necessary to exploit thinner seams where top or bottom rock had to be removed in haulageways to provide sufficient room for mine cars and loading points. Thus, the number of men engaged in rock drilling rapidly increased.

PROGRAM PROVES ITSELF

So in 1937, company management decided to tighten up on dust control by taking aggressive steps, as indicated by the results of increasing research into the subject. Today, looking back over the past 15 yr of its program, Hudson's management sees these solid achievements:

The entire property has had a number of complete dust surveys. Every working place has been repeatedly examined, and corrective steps have been taken in those places where dustiness exceeded permissible limits.

Company officials, from section foremen to top management, strongly support the dust control efforts. Mine superintendents have had an important part in the program right from the planning stages, and they in turn enlisted the enthusiasm of the supervisors at their collieries.

Finally, the men at the face will never return to dusty conditions, once they have been convinced that dust can be controlled with little extra effort.

To initiate the program in 1937, John D. Cooner, then a company safety inspector and now in charge of mining research at the Bureau of Mines Anthracite Research Laboratory, Schuylkill Haven, Pa., was selected to study the problem and recommend a course of action.

Mr. Cooner traveled throughout hard-rock mining regions in Canada and Michigan to gather information on the subject of dust control and reported back to top management with these four recommendations:

1. Sampling equipment and a microscope should be provided in order that dust concentrations at various places on the property and under various operating conditions might be evaluated.

2. A dust laboratory should be provided which would be equipped with facilities to maintain a routine check of dust concentrations and their evaluation.

3. A library of literature pertaining to mine dusts, the diseases caused by dusts and compensation laws should be initiated and kept up to date.

4. All development places where

top or bottom rock is removed should be promptly converted to wet drilling.

These measures were approved and Mr. Cooner began his koniometer survey of the property. After 2½ yr, Mr. Cooner was transferred to the operating department and Carl A. Peterson was transferred to the safety department to continue the dust studies. Mr. Peterson contributed in great measure over the next 3 yr through his investigations of improved sampling methods, laboratory test methods for determining the silica content of dusts, effectiveness of wetting agents and the best methods of recording useful dust data.

In 1942, Mr. Miller was transferred to the safety department as an inspector with the primary duty of continuing the dust investigations. Among other pursuits, he studied drilling methods and equipment in search of those that would produce the least dust. After 2 yr, when it was felt that the dust problem had been somewhat alleviated, Mr. Miller returned to the operating department.

But in recounting this history, there is a point. The point is that if a dust-control program is to remain virile, top management must show the way. Hudson's management decided the program could be better, and in 1946 Mr. Miller returned to the safety department with the title of dust engineer. Mr. Cooner was safety engineer.

ACTIVITIES INTENSIFIED

The scope of the investigations was widened to include even a diligent study of aluminum therapy in preventing or palliating the lung damage caused by siliceous dusts. In short, dust-control activities were intensified at all levels.

During this period, the functions of the laboratory also were broadened. Since early 1943, the laboratory procedures had been in the capable hands of Dorothy C. Hahn, and now new equipment was installed to make the laboratory an even more valuable component of the dust-control program. In addition to equipment for evaluating the dust samples, the new facilities now permit the completion of certain clinical tests when employees file silicosis claims or when employees who were injured are in rehabilitation. The latter are a control group, and test data from such cases assists in noting the progress of disability resulting from possible lung damage.

At present, Mrs. Hahn makes five clinical determinations, as follows: complete blood count, complete urinalysis, erythrocyte sedimentation rate, tuberculosis and syphilis. The report of these tests, which formerly had to be made by outside agencies, is forwarded to the medical board to assist the members in diagnosis.

Mrs. Hahn's qualifications for her work are based upon her training in medical technology at Moses Taylor Hospital, Scranton, and subsequent service at Geisinger Memorial Hospital, Danville, Pa.; Lankenau Hospital Research Laboratory, Philadelphia; the research laboratory at Moses Taylor, as supervisor, and the Armed Forces Institute of Pathology, Washington, D. C.

In 1950, Mr. Miller was promoted to safety engineer, but he carried with him the responsibility for continuing the dust-control discipline. The field work now is assigned to recent graduates of engineering schools who have joined the company to begin their professional careers. This assignment permits the young engineer to view the entire property and provides him with a definite duty and responsibility. Furthermore, the company is assured of conscientious effort in the important job of dust surveying.

CONTINUOUS SURVEYS THE RULE

In the early stages, Mr. Miller coaches the survey engineer in the techniques of sampling with the midget impinger and in reporting dust conditions in and about the mines. The survey requires about 6 mo for the entire property; then the survey engineer moves on to new duties with the company and another recent graduate takes his place. Dust surveys, therefore, are a continuous operation, and new members of Hudson's official family are indoctrinated from the start into the importance of the dust problem and top management's concern in the matter.

The samples obtained in the surveys are returned to the laboratory, where Mrs. Hahn evaluates dust counts and free-silica content with the aid of a midget microprojector. The microprojector was designed by the safety department and built in the company's Providence shops.

In the intervals between these formal surveys, safety inspectors keep a constant vigil over dust conditions and each colliery superintendent files a monthly report covering the condition of dust-control equipment. Copies of all these reports are brought to the attention of the top operating officials.

KEY STEPS TO SUCCESS

As important steps in building a dust-control program, Mr. Miller suggests the following:

1. The impetus must come from top management. On a company-wide scale it is top management who must finally say there is a dust problem and something must be done about it.

2. For maximum effectiveness, dust studies should be the principal duty of at least one qualified engineer. Thus, the effort will be concentrated and a more rapid rate of progress usually will be attained.

3. If the work is to get anywhere at all, some investment in equipment is necessary. Usually, this proves to be a matter of spending a little to save much, when the returns finally come in.

4. Operating officials should be in on the planning to insure aggressive promotion of the program at the mine. Then all must join in convincing the workers in and about the mines that working places don't have to be dusty.

5. You can't merely initiate a dust-control program then hope to have it operate on its own momentum. It must be recognized as a continuing duty by all officials.

6. Dust control might best be classified as an inexact science. New developments are brought to light almost daily. Those in charge of the work must be alert to search out and assimilate the new knowledge as it is offered.

In the matter of dust control, Hudson's top management, including G. B. Fillmore, president; E. C. Weichel, vice president; and J. M. Reid, general manager, bases its program upon these principles.

★ ★ ★ ★ ★

Traveling Light

Two cowboys were about to leave for a trip to the desert. One of them was talking to a stranger who inquired about their equipment.

"My pardner and me are traveling light. He's taking nuthin' but whiskey for rattlesnake bites."

"And what are you taking?"

"Two rattlesnakes!"

—Hanna Coal News

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Qualities Industry Wants In Its Supervisors

INDISPENSABLE—Technical Ability, Personal Integrity, Responsibility

ESSENTIAL—Leadership Ability, Adaptability and Perspective

IMPORTANT—Cost-Consciousness, Confidence, Optimism

J. KENNETH SALISBURY, division engineer, Thermal Power Systems Div., General Engineering Laboratory, General Electric Co., Schenectady, N. Y., wrote an article setting forth the desirable qualities engineers should possess. Mr. Salisbury's thoughts appeared in the *General Electric Review*, May, 1952. Since good supervision is based on the same qualities, we present the following abstract of Mr. Salisbury's conclusions.

HAVE YOU EVER asked yourself the question "Why did I know so little 10 yr ago about what really is important?" Every one of us would conduct his life differently if today he had the wisdom of 10 additional years. There is only one reason for the nonexistence of this happy situation: none of us really understands a situation that he himself has not experienced. Wisdom simply is not made of secondhand knowledge of the lessons learned by others.

Industry does not assume the character of its financial statement or of its physical facilities; rather, it assumes the character of its people. In the long run, therefore, industry can improve itself only by adding employees with desirable characteristics.

What are the desirable characteristics we'd like to find in engineers [or supervisors—Ed.]? What are these qualities in terms that are tangible and specific? To me, there are 15 vital qualities. We may class five of these as indispensable, five as essential and five as important, although I doubt this word is strong enough.

INDISPENSABLE QUALITIES

1. **Technical ability**, although developed formally in a college engineering course, usually is also the product of one's environment, hobbies and natural inclinations. It can be divided into two major subdivisions: Creativeness and analytical ability. Only rarely does an engineer possess both to an outstanding degree. One normally tends to catalog engineers either as analyzers or synthesizers—the analyzers are the appraisers and evaluators; the synthesizers are those who are creative and ingenious in devising new ways of doing things. However, there is considerable overlapping.

I think I am reasonably safe in placing technical ability at the top of the list. It is not, however, as the mathematicians say, a "necessary and sufficient condition."

2. **Aggressiveness** must accompany technical ability. One must have the energy, the vigor of intellect and the spark to exercise his technical ability, or it avails him nothing.

Every engineer with experience in industry has encountered the person of superb technical competence who is capable of handling with ease fourth-order differential equations, but who is incapable of initiating the accomplishment of any useful objective. These people tend to sit in a corner ana wait for their problems to come to them. They perform beautifully when given a specific assignment and a date on which it must be completed, but they do not initiate new work in which they can make full use of their talent.

On the other hand, we have known people of mediocre technical ability who are continually thinking about the job, and who perform assigned work expeditiously to the full extent of their somewhat limited abilities. These are the aggressive ones—the ones who are outstanding performers when used within the limits of their technical abilities. They move swiftly and surely. Things happen when they are around. It is management's duty to make available for their assistance others who excel them in purely technical mattters. Thus is formed a team that has more capacity than the sum of the individuals.

Aggressiveness may have unfortunate consequences, however, unless it is accompanied by the third indispensable characteristic.

3. **Understanding of human relations** is vital. The aggressive engineer who does not comprehend the effect of his aggressiveness on his associates is likely to incur their displeasure, and as a result fail to obtain their cooperation.

Skill in human relations implies an innate personal kindness—a tolerance toward the shortcomings of others. In a supervisor, it requires a comprehension of the things that motivate the individual, a recognition of his merits and a knowledge of his weaknesses.

Only rarely does an engineer make a complete failure of his career through lack of technical ability alone. On the other hand, there are numerous failures that result from a lack of understanding of human relations. These are the people who within the first minute of a conversation arouse a feeling of antagonism. They disregard the sensibilities of others and rise by stepping on the shoulders of their associates. Such gains are effective for a brief moment, but they build up a permanent deficit in the human-relations account. They presage the future lack of cooperation by others that limits the engineer's accomplishments.

In fact, it has long been my opinion that the key to all understanding of human relations lies in the single word sincerity. The sincere man never has trouble in getting along with his associates. It is the cagey ones, the tricky ones and ones with ulterior motives who have difficulty. Obviously, this does not prohibit the use of tact in one's dealings with fellow engineers, but it does eliminate untruths and half-truths and concealment of pertinent facts.

4. **Responsibility** is the fourth indis-

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pensable characteristic. The engineer must assume that he is personally responsible for the success of the endeavors in which he is engaged. He must make decisions, but at the same time have the good judgment to consult his superiors on any questionable decision, because this is the essence of responsibility.

5. Personal integrity, the fifth indispensable quality, may also be called highmindedness. It is the all-consuming insistence of the engineer that he do what is right at all times. It is character.

Personal integrity implies an intrinsic honesty, an intellectual fairness in all things and good judgment. It is identified by promises that are kept, though made in a word or two, even when forgetfulness might provide a plausible excuse. It eliminates the need for written instructions and confirming memoranda.

ESSENTIAL QUALITIES

1. Leadership and organizing ability are the first of the qualities essential to a brilliant career. They can be developed by all engineers, even in the earlier years. Leadership, which is a product of many things including the five indispensable characteristics, invariably includes the important ability to inspire one's associates, and this inspiration frequently is the result of one's conduct of his own job. An emulation of the boss's approach to problems is natural and normal. The members of his organization nearly always reflect his standards and aspirations. For this reason, if for no other, you may demand that your boss be a superior person. Indeed, he must be, if you wish to improve yourself. Subconsciously you will acquire at least some of his personal characteristics.

Administrative ability has been typified in one word—persuasiveness. To convince others to do things, one must clearly explain the over-all objectives, the logic behind the procedure and the worthwhileness of the objective. Only when subordinates can carry on without assistance from the leader has he accomplished the basic purpose of organization: that is, delegation of responsibility.

2. Responsiveness is my own private term for a combination of characteristics. It is the willingness to see the boss's point of view and an intense desire to carry out any reasonable objectives laid down by him.

Engineers in industry are expected to have initiative and originality, and to require only occasional supervision. A large part of what they do is self-inspired, and intended to be. Occasionally, however, a specific instruction is given by a superior, either on a small task or on one of considerable duration. Such instruction should take priority over self-inspired work, which must be deferred until the specific objective is accomplished. Responsiveness is that characteristic which causes the engineer to set to with a will, finishing the work competently and in the shortest possible time.

3. Adaptability increases the usefulness of any engineer. He must be willing to undertake any assigned job, and to devote his every effort to mastering it, regardless of whether it is his personal choice.

Adaptability is a willingness to work under handicaps. Regardless of where an engineer works, there are situations that are not palatable to him, that make it more difficult for him to carry out his assigned tasks and that slow him down. One must live with these and make the best of them.

4. Perspective is the quality that permits an engineer to assign correct relative importance to all things within his scope. It is the quality that permits him to make approximations when they are justified; it is the quality which impels him to work on things which are important to his company or which may be important in the future. The man with perspective invariably does first things first, relegating non-essential items to a later time.

Perspective is the quality that enables an engineer to understand his position in the company. Also, it enables him to assume authority when he should, delegate it when he can and to consult his superiors when it is advisable. Although experience is bound to improve perspective, it is basically a native talent, and those who have it are able to select the critical problems.

5. Introversion and extroversion are very personal qualities which in combination are of tremendous value to the engineer. The introvert is the thinker—the man with internal self-confidence that can result in useful, progressive forward movement. On the other hand, for maximum achievement the engineer must combine a modicum of extroversion with his normal introversion. His introversion enables him to seclude himself and after objective study to arrive at the right answer. However, his extroversion then enables him to sell it to his associates and to his superiors. No idea, regardless of its worth, is of value until it is implemented.

The inarticulate engineer, no matter what his competence, may be doomed to a life of monotonous intellectual activity and investigation. He lacks the ability to communicate thoughts. The pure extrovert is doomed to remain forever a front man, a hand shaker and a back slapper.

IMPORTANT CHARACTERISTICS

1. Ethics, both company and business, are a responsibility of the engineer. So many safeguards are set up in the modern industrial organization that it is nearly impossible for any individual engineer to violate his company's code of ethics. He should strive not only to live by this code but also to spread its implications among all his associates. It is a most precious asset for any company. It is easy for an engineer to live in his environment if his personal code of ethics is consistent with that of his company. It is hazardous and unpleasant for him if it is not.

2. Cost Consciousness is an important attribute—consciousness not only of dollars but also of manpower, materials and effort. Every engineer controls to some degree the expenditure of these ingredients of his company's products. He must exercise this control wisely.

3. Confidence is tremendously desirable. The engineer must have confidence in himself, in his company and in success. He can then give to those with whom he works the strength of spirit and the morale that are essential to forward progress. Confidence does not mean cockiness. It is rather a quiet conviction of competence and adequacy. Confidence is the quality that lends us strength. It is born of the experience of past successes.

4. Efficiency causes one to economize on his time, to plan his work well and to exercise extreme self-discipline. To a very considerable extent, it is the young engineer's [or supervisor's—*Ed.*] integrated effort over his first 10 yr in industry that measures his accomplishment at the end of that period. It is my firm belief that the individual profits far more by his own intensive effort than does his company. Your company can survive with a low level of effort on your part but you cannot.

5. Optimism is a virtue the world around. All of us have known the man with a negative attitude. He can be convinced, but it takes hours of valuable time. He never can be an outstanding member of any organization.

Then there is the boss who is predisposed to accept your solution. He assumes you are right until he uncovers evidence to the contrary. He believes in you as an intelligent conscientious human being. You like him. You enjoy working with him and being around him. He attracts competent people for this reason alone. They co-operate and his business prospers.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

The Changing Times . . .

Sign over a drinking fountain:
Due to the general increase in prices, the water from this fountain is now twice as free as it used to be.

★ ★ ★

Two visitors were riding down Constitution Ave in a taxi when they passed the National Archives Building. Seeing an inscription: "What is past is prologue," written across the building, one of the passengers asked the driver what it meant. "That," said the cab man, "is government language. It means: 'Brother, you ain't seen nothing yet.'"

★ ★ ★

When the time comes for the meek to inherit the earth, the taxes will probably be so high they won't want it.

—Red Jacketeer

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

OVER 8,600 HOURS ON THE METER

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Colonial Coal Co. is 100% Caterpillar powered at this strip mine near Madisonville, Ky. The Caterpillar D8 Tractor with Cat No. 8A Bulldozer, pictured above, is 'dozing No. 12 coal directly out of a vein four feet thick. Note the rolling action and high blade load. This Caterpillar 'Dozer moves a lot of coal in an eight-hour working day. In two years it has worked over 8,600 hours—with *no down-time!* "All we've done is tighten the tracks and rollers," says C. A. Kelly of Colonial Coal Co. "That's real dependability. No wonder we prefer Caterpillar over any other machines."

Two other D8s drive air compressors—one a 600-ft. Jaeger, and the other a 500-ft. Worthington. Both compressors power Cleveland drills. A Caterpillar D7 Tractor completes Colonial's "stable" of powerful yellow machines.

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Matching power of D8 Tractor to blade capacity of its teammate, the No. 8A Bulldozer, means easy maneuvering and long, trouble-free work life. Moldboard is scientifically curved for rolling, higher production loads. Blade features hard-wearing, high-carbon steel cutting edge, and extra-heavy bracing for extreme rigidity. Choice of cable or hydraulic control, angling or straight blade, to fit your requirements.

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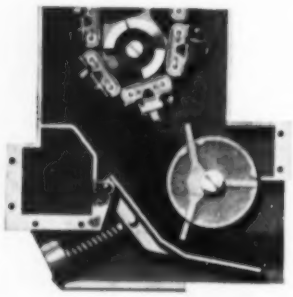

SLACK HANDLING DEVICE

With this unit, the cuttings are automatically removed and stowed in a slack pile to the right and rear of the machine. No further cleaning is necessary before shooting.

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Jeffrey Shortwall Cutters include all the modern features essential to long life, rough usage, high production and low cost operation.

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Movement of these machines is controlled by two power-driven wire rope drums with independent controls. The clutches controlling these drums are easily operated to give quick response to adjustments in position of machine whether in the low-feed speed or high-handling speed.

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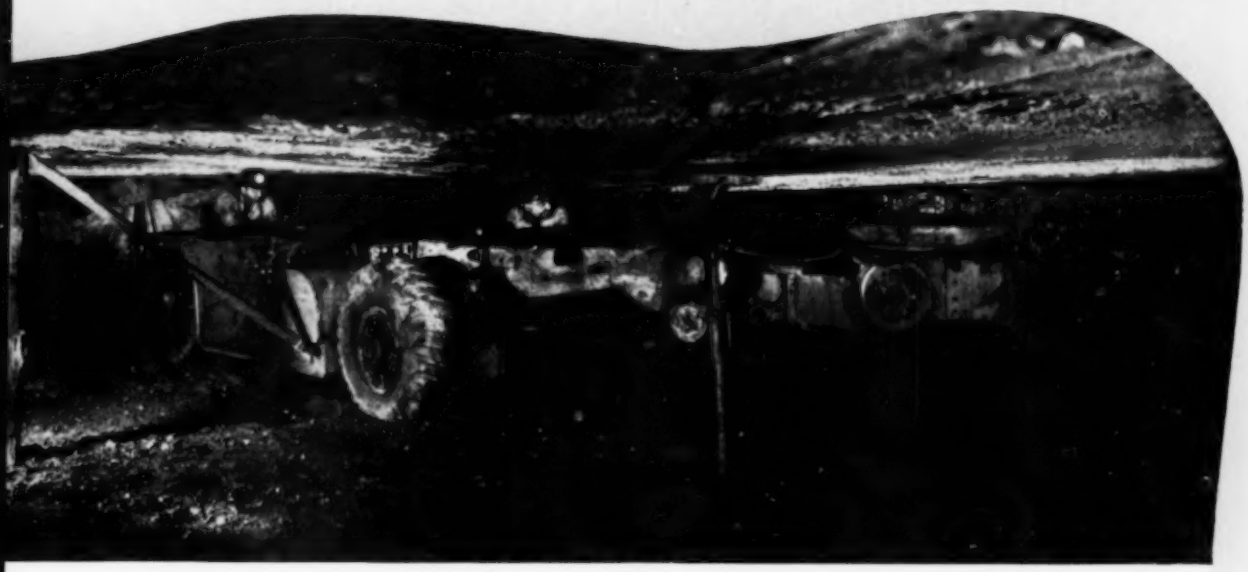
# of coal cutting requirements

CUTTING MACHINES



UNIVERSAL CUTTING MACHINES

Probably the most popular feature of this Jeffrey Type 70-UR Universal Cutter is its all-around utility. Its cutter bar can be completely rotated in either direction and positioned to make any kind of a cut any place in the seam.

From one position, it can make a 30-foot horizontal cut (with a 9-foot cutter bar) or a shearing cut 5 foot, 5 inches on either side of the machine's center line. Maximum top cutting height of a standard machine is 7 foot, 9 inches, but can be furnished to make top cuts up to 13 feet.

The machine illustrated is mounted on large pneumatic tires and equipped with hydraulic steering to facilitate maneuverability regardless of floor conditions.

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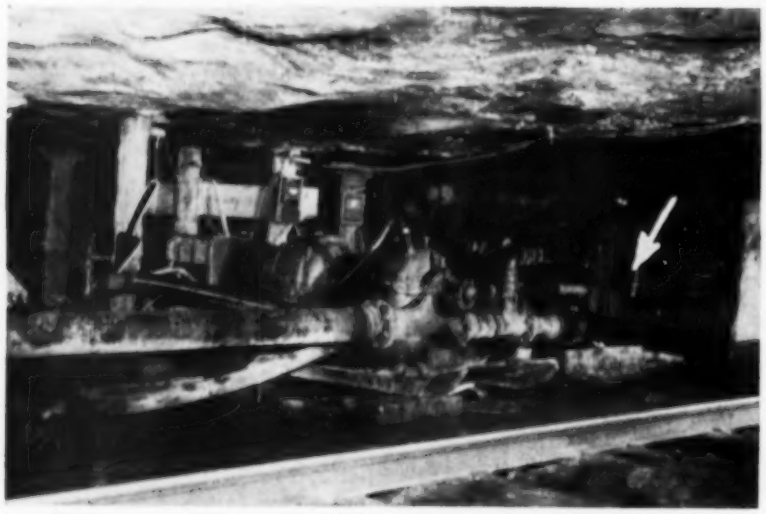
Operating Ideas

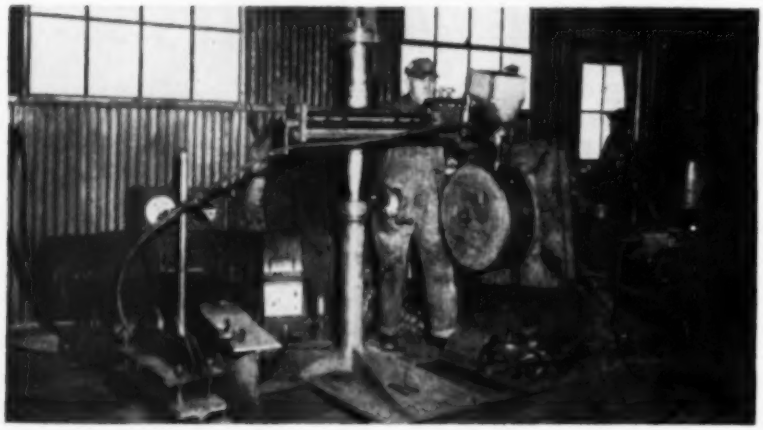
Three-Pump Station Is Set Up to Handle All Conditions



ONE LARGE PUMP for wet seasons and two smaller pumps, one for normal water influx and the other a spare, have been installed together in one station in the Lower Cedar Grove seam of the new No. 17 mine (see p 86) of the Red Jacket Coal Corp., Red Jacket, W. Va.

Operating the one small pump, whenever it can handle the water, saves power and minimizes attention by taking a longer time to empty the sump. If the larger pump breaks down during a wet period, the two smaller units operated in parallel can hold the water down until the difficulty can be remedied.

The larger pump is a Weinman 6-in centrifugal unit driven by a 25-hp motor. It has a 6-in steel pipe for suction and discharges through a 6-in plastic pipe extending 1,500 ft to a drainage ditch. The two smaller pumps are Marlow self-priming centrifugal units driven by 3-hp motors and are equipped with 3-in plastic pipe for suction.



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TAKE FACTORY-BUILT MACHINES, add labor-savers designed and built in the shop by imaginative men, and you come up with a combination that means easier, better work.

Take resurfacing, for instance.

In the shop at the Tiger mine, Hume-Sinclair Coal Mining Co., Hume, Mo., M. H. Shorter, mechanic, standing behind his machine in the above photograph, has brought together a Lincoln welder Type SAE 60, a Cullen-Friestadt welding positioner and a Manual Lincolnweld electrode feeder. To these he has added his own welding-head positioner and an oversize flux feeder. The result is a first-rate resurfacing rig that guarantees smooth, even distribution of metal with a minimum of attention.

The table of the Cullen-Friestadt positioner can be set at any angle from vertical, as shown in the photograph, to horizontal, and can be made to rotate up to 30 rpm. The part to be resurfaced—in this instance, a yoke block bearing for a 5560 Marion shovel—is fixed in position on a shaft extending through the table and the table is tilted to the desired angle. The shaft is turned by a ½-hp Louis Allis motor at whatever speed gives best welding results—very slowly with the yoke block bearing shown, since best results are obtained at linear speeds of 26 to 28 in per minute. With parts of smaller diameter, rotating speed would be higher to give the same linear speed.

Electrode, purchased in 50-ft spools and housed in the Lincolnweld, is fed automatically through 15 ft of flexible hose to the welding head. Speed of feed is controlled by the setting for voltage and amperage.

The welding head itself is at the bottom of an oversize automatic-feed flux box, designed and built in the Tiger shop by Mr. Shorter. Flux flow is controlled by a valve at the base. The valve is set manually for faster or slower speed by a device visible at the top of the flux box. The electrode and the flux, passing through the funnel-shaped base of the flux box, make up the welding head.

The welding head, together with the flux box, is attached to a two-way positioner built by Mr. Shorter. This positioner consists of a vertical shaft for raising or lowering the welding head and a horizontal shaft for moving the head from left to right. Screw threads on both vertical and horizontal shafts are carefully machined to move the head ¼ in vertically or horizontally with one full turn of the proper hand crank.

HOW KENNAMETAL ROOF BITS HELPED

BOOST PRODUCTION 25%

HITCH TIMBERING with KENNAMETAL BITS INCREASES AIR COURSE 20%

Kennametal SD 6½-inch Drill Bits are used in the Nelms Mine to drill for hitch timbering throughout the haulage ways. Four 3½ foot holes are drilled per setup and to date about 4,000 hitch installations have been made. Air course has been opened up about 20%, and safety conditions improved.

SPECIAL SLABBING METHOD GIVES 1/3 MORE RECOVERY

An unusual method of recovery is practiced by the Nelms Mine in bolted areas. Eighteen foot rooms with bolts at three foot centers are driven all the way up, nine feet are slabbed out, and timbering is done as the coal is loaded. Recovery is about ⅓ more than formerly obtained.

The Nelms Mine of the Youghiogheny and Ohio Coal Co. has tried every available make of roof bit in their extensive roof bolting program. Their records show that the Kennametal HFD Rotary Roof Bits now in use consistently deliver the best performance and service.

These tough, Kennametal-tipped bits drill 42" holes in blue slate, shale, and sandrock at rates as high as 20 holes per hour per bit, with the result that roof necks are bolted in ⅙ the time previously needed. By so improving the efficiency of roof bolting, Kennametal Roof Bits are an important factor in the 25% tonnage increase that bolting has made possible in this mine.

Kennametal offers a complete line of bits for cutting and drilling—with tips whose shock and wear-resistant characteristics cannot be matched by any other tungsten-carbide in the coal industry. Kennametal representatives—men with years of actual mining experience—will recommend the right bit for the job, and go into the mine to demonstrate the operation. Call *your* Kennametal representative today!

Kennametal Inc., Mining Tool Div., Bedford, Pa.

KENNAMETAL®

Quality Carbide Of The Coal Industry

World's Largest Manufacturer of Tungsten-Carbide Mining Tools

Swivel Protects High-Voltage Cable In Strip Pit

A SWIVEL ARM welded to high-voltage cable sleds has helped prevent accidents resulting from handling and moving cable at the Bradford No. 1 mine, Hannah Coal Co., Div. of Pittsburgh Consolidation Coal Co., St. Clairsville, Ohio. Made from pipe and angle iron, the new support permits the cable to follow the path of the electric shovel when moving and prevents fouling by the sled.

Threefold accomplishments credited to the new swivel are:

1. Eliminates excessive handling of the high-voltage line.

2. Keeps the cable off the ground directly in front of the sled and eliminates the need for a cable attendant at the sled when a shovel move is made.

3. Eliminates the danger of running over the cable and causing breaks in the insulation.

Old-type sleds had no protection for keeping the cable from getting under the sled or being run over when the shovel was moving. Superintendent George Pyle got the idea for the protective device after seeing a sled run over a cable in his strip pit. Company employees built the swivel in the field.

Easy Way to Grind Sheaves and Pins

HAVING TROUBLE grinding worn sheaves and pins after they have been resurfaced?

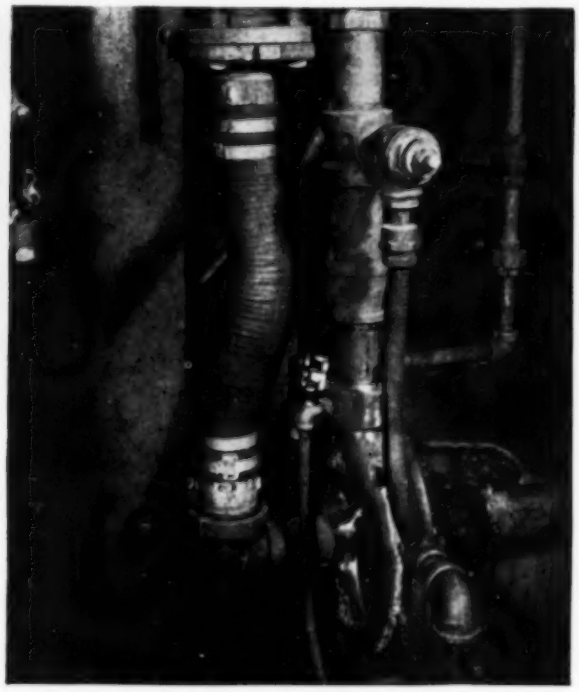
Here's how the job is eased in the shop of Crowe Coal Co., Clinton, Mo., where R. H. Bradley (left), shop foreman, and Albert Williams (right), chief electrician, built a machine from two motors and some spare parts.

A ¼-hp Wagner motor with a belt power-take-off turns a shaft on which a sheave or pin is mounted through a Ford truck transmission, a gear box from an outmoded Montgomery-Ward home coal stoker, and a differential from an International truck.

The Norton grinding wheel shown on the machine in the accompanying photograph is turned directly by a 15-hp G.E. motor. Motor and wheel are mounted on a sliding bench that can be locked in place when the grinding wheel is properly placed against the sheave or pin.

The sheave appearing in the photograph, mounted for grinding, is an idler from a Bucyrus 1250 dragline. A base of mild steel already has been laid in the sheave channel and has been topped with hardsurfacing. In that operation, the machine turned the sheave at slow, even speed to assure correct distribution of added metal.

The snake-like tube with its flared end, visible above and beyond the machine, sucks up fumes from the welder's torch and exhausts them outside the shop. A similar exhaust tube overhangs the welder's bench near by. The exhaust fan for both vents is driven by a squirrel-cage motor, 15 hp, 1,800 rpm.



Hose Section Cuts Pump Repairs

A SERIOUS PUMP FAILURE PROBLEM was solved by maintenance engineers at the Thermoid Co., in Trenton, N. J. It was impossible to align an intake pipe precisely with the intake side of a centrifugal pump. As a result the casting on the intake side of the pump broke frequently because of vibration and stresses caused by slight misalignment of the pump. Loss of production and high maintenance costs resulted from frequent failures.

Installation of a short piece of Thermoid suction hose in the suction line has stopped casting failures. Production is no longer interrupted and maintenance costs have been reduced.

The centrifugal pump is driven by a 15-hp motor and supplies 250 gpm of water at 120 psi. The suction hose installed in the circuit is built to withstand the pressure and yet is flexible enough to absorb the stress of misalignment and vibration.

WIRE ROPE, too, resists attack with the RIGHT KIND of muscle

Brawny chest and shoulder muscles make the gorilla a formidable foe in the eternal warfare of the jungle. Defending himself and his family, this 450-pound heavyweight stands erect and fights back with sledgehammer blows of his mighty forearms.

In wire rope, too, it takes the right kind of muscle to resist constant attack of abrasion, corrosion, bending fatigue, load strain and shock stress.

Complete quality control of Wickwire Rope means that you can always count on the right grade of steel and size of wire; the right construction and lay of the rope for best results on your particular job.

See your Wickwire Rope distributor or contact our nearest sales office.

THE COLORADO FUEL AND IRON CORPORATION — Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa

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A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

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THE COLORADO FUEL AND IRON CORPORATION

CUMMINS DIESELS are engineered to make light work of tough jobs

Progressive, eyes-ahead engineering is one of the big reasons why so many mine and quarry operators pick Cummins Diesels for dependability.

Consider Cummins' exclusive system of fuel injection and metering—an important factor in the unequalled performance records established by lightweight, high-speed (60-600 h.p.) Cummins Diesels. No other Diesel fuel system is so simple . . . so rugged! It delivers a uniform, properly prepared fuel charge to every cylinder. All under low pressure—no chance of bursting and leaking fuel lines.

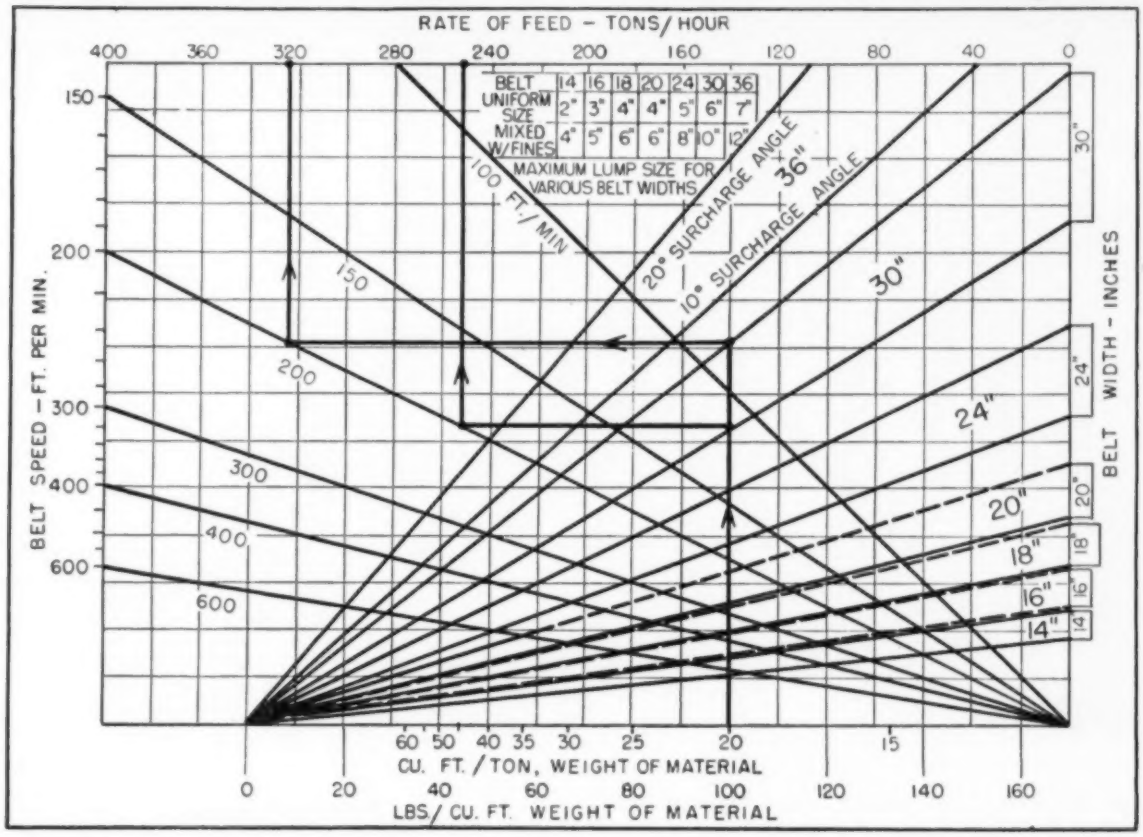
Your Cummins dealer will be glad to tell you more about the exclusive fuel system and other engineering advantages built into every Cummins Diesel. He is an expert who knows the requirements of your job. He heads up a specialized parts and service organization—equipped to handle all your diesel power needs. Call him today . . . or write!

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana

Export: Cummins Diesel Export Corporation, Columbus, Indiana, U.S.A. • Cable: CUMDIEX

CUMMINS

Leaders in rugged, lightweight, high-speed diesel power!



EXAMPLE: What tonnage would a 30-in belt deliver traveling at 200 fpm if the material weighed 100 lb per cu ft (20 cu ft per ton)?

ANSWER: For a surcharge angle of 10 deg, 252 tph. For a surcharge angle of 20 deg, a 30-in belt would deliver 324 tph, this chart shows.

Chart Simplifies Conveyor-Belt Selection

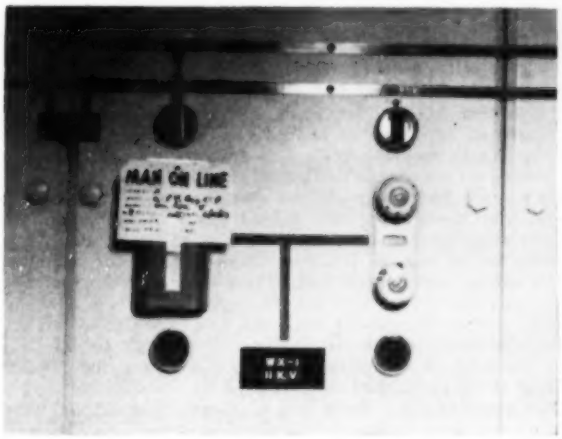
C. W. MATTHEWS of O. W. Walvoord Co., Negaunee, Mich., submitted a handy conveyor-belt selection chart to *Engineering & Mining Journal*. It is a composite of information contained in the "Goodyear Book of Belting" and Hetzel and Albright's "Belt Conveyors and Belt Elevators," Table 8-b, published by John Wiley & Sons Co., Inc.

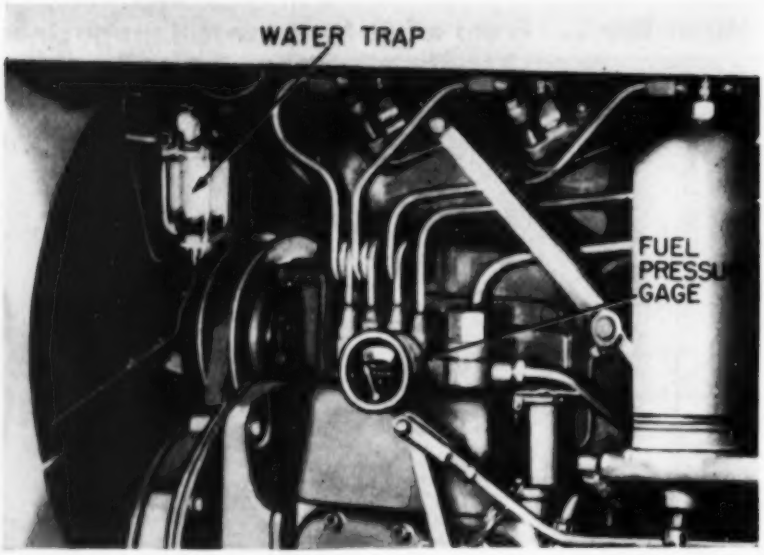
Given any combination of known information such as belt speed, rate of feed, weight of material, surcharge angle, width of belt, it is possible to determine an unknown quantity quickly. The above table also indicates the maximum lump size for various belt widths. The answer to the example above is typical of the use you can make of it.

Covers Stop Switch Errors

ADDITIONAL SAFETY PROTECTION at the Pacific Gas & Electric Co. is provided by plastic or wooden covers on control-board switch handles. They prevent operation of switches when equipment is being serviced or repaired and supplement conventional warning tags. They have proved their value over a number of years, *Electrical World* reports. Covers are used on vertical and bench-type handles. Variety of types and designs of switch handles does not permit standard design of covers.

A somewhat similar safety precaution in use at the 7,000-tpd preparation plant of the Sunnyhill Coal Co., New Lexington, Ohio, was previously described in *Coal Age* (December, 1951, p 108). Here, each repairman is supplied with colored plastic covered wires which he uses to tie into the off position the motor-starter handle of the particular unit he is working on. Each man has his own color of wire, and only he personally is authorized to remove his wires.





THE WATER TRAP may warn you of condensation in the storage tank. The fuel-pressure gage, when it gives a low reading, may be telling you a replacement fuel filter is called for.

Watch Your Diesel's Diet

Here are some tips on how to provide clean fuel and air with a minimum of time and effort. The pay-off is in better performance and lower engine repair costs.

By FRED J. SHRECK, Supervisor of Service
Industrial Power Div., International Harvester Co., Chicago

DIESEL ENGINES are mighty dependable, but they must be treated right or they cannot do their job. The two most essential items in their diet are clean fuel and clean air. While diesels are economical in the use of fuel, they suck in air like a mile runner on the last lap.

For example, a 1,000-cu-in diesel engine, running at rated rpm, breathes in approximately 865 cfm, or more than 415,000 cu ft in 8 hr. This is enough air to fill a building 100 ft square and four stories high.

CLEAN FUEL . . .

Above all, the fuel and air fed to the diesel must be clean. Clean lubricating oil is desirable and important, but not nearly so important as clean fuel and air. That's why the makers of diesels lavish such care on the design and manufacture of fuel filters and air cleaners. Without these units, the rugged, dependable diesel would strangle itself on dirty air or become damaged internally by foreign matter in the fuel. These are reasons why it pays big dividends to provide proper storage for fuel and give regular attention to the air cleaner.

Naturally, it is smart practice to use only the grade of fuel recommended by the manufacturer. Some fuel suppliers will offer substitutes that are "just as good" to hear them tell it. But the recommended grade of fuel will produce at the drawbar the horsepower that the manufacturer guarantees. It doesn't make sense to use inferior fuels and thereby lose power.

PROPERLY STORED . . .

Proper storage of fuel is equally important. It may be stored above or below ground, but underground storage is preferable because temperatures are constant and there will be less condensation in the tank. However, in either method, provision should be made for accumulation and removal of water and sediment from the tank. A drain at the base of the tank should be provided to remove periodically the water and sediment that settles there.

The pump suction pipe should not reach into this area to eliminate any chances of putting water or sediment into the fuel systems of the machines. A screen filter should be provided in the storage-tank-filler neck and the filler neck should be kept carefully capped. Also, the nozzle of the fuel-tank hose should be hung in a protected place so that dirt and water cannot enter.

AND INTELLIGENTLY USED . . .

Furthermore, don't pour "scraps" of fuel back into the storage tank. The small containers may have kerosene or gasoline in them and even small amounts of these will contaminate the diesel fuel. You might better use this fuel for washing parts or throw it away.

Watch the glass water trap in the engine. If water is accumulating in the trap at a rapid rate, it's a pretty good indication that contamination is taking place where the fuel is stored. All these precautions add to the life and efficiency of the fuel filters which guard the injection systems of your diesel engines.

There are no rigid rules for changing fuel filters, but low readings on the fuel-pressure gage ordinarily indicate a stopped-up filter. Replace filters with the recommended type and make sure they are sealed properly so they'll work efficiently. However, you won't have to change filters very often if the fuel is properly stored.

The other important item in a diesel's diet is air—and it must be clean. When dusty conditions prevail on the job, it is wise to extend the air-cleaner intake pipe so that it will reach the cleaner air above the dust level. Erroneous claims have been made that extended air-cleaner pipes tend to smother an engine. Actually, the opposite is true, since there is a greater column of air in the extended pipe.

Under dusty operating conditions, it is important to clean the air cleaner at frequent intervals. The oil tray should be removed, washed and refilled, and the screens in the upper portion should be washed in kerosene.

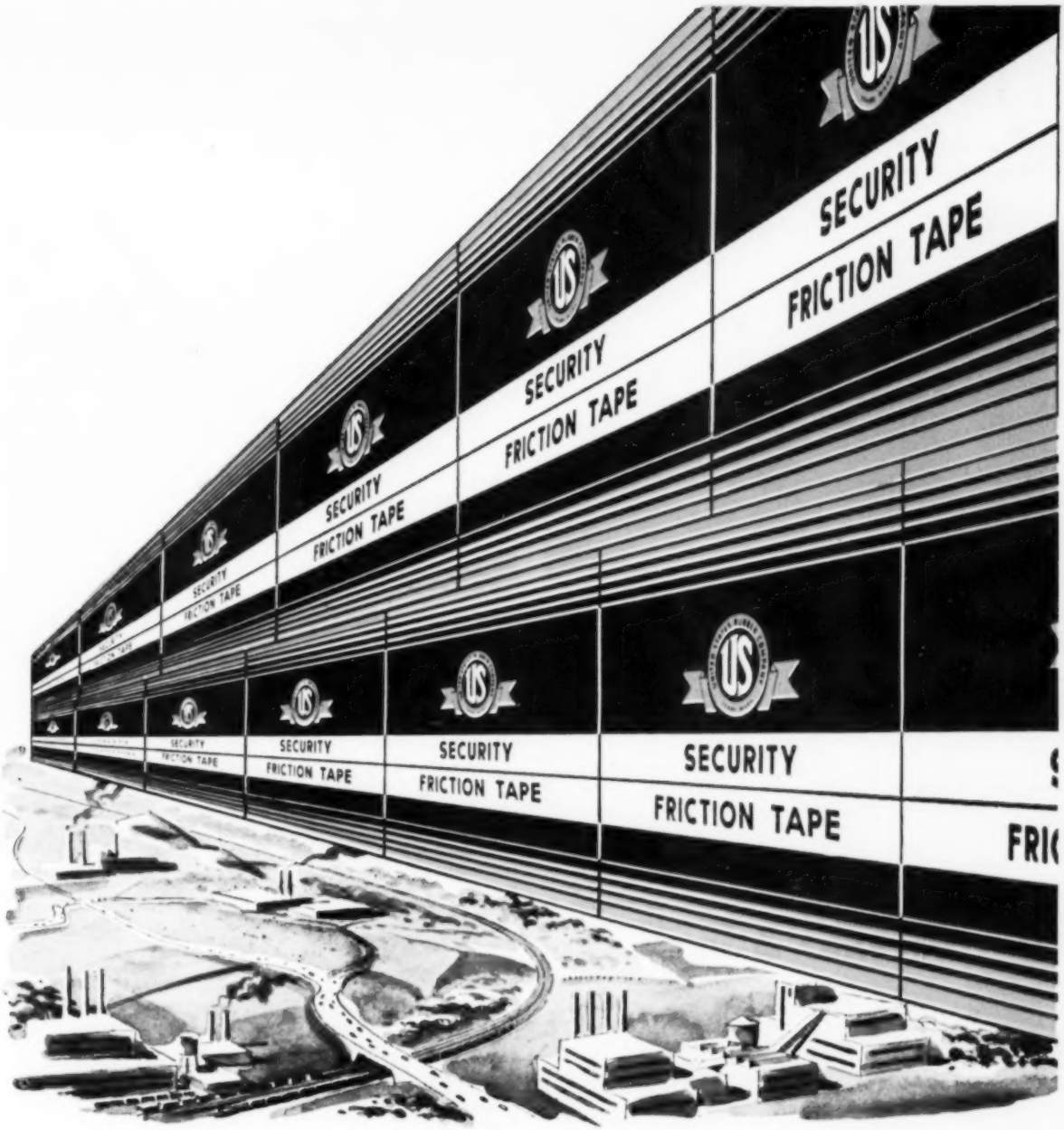
There are other trouble spots. Leaks may develop at the connection between the air cleaner and intake manifold and between the manifold and cylinder head. You can check these points by taking a squirt can filled with water or kerosene and squirting the fluid around the joints. If any of the liquid is sucked into the engine, there is an air leak at that spot. The leaks should be repaired immediately to prevent serious damage in the engine.

INSURES GOOD RESULTS

Taking these precautions requires little time and effort. Yet they will extend the life and increase the efficiency of diesel engines to a remarkable degree.

You're Invited . . .

TO TELL COAL AGE about any "Operating Idea" you've successfully put to work at your property. Give us a line on what it is and what it does and we'll try to arrange for a COAL AGE editor to visit you to take pictures and prepare a write-up. We're always on the lookout for good ideas, and other mine officials will thank you, too. Just drop a note to: The Editor, COAL AGE, 330 W. 42 St., New York 36, N. Y.



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Equipment News

Rock Drill and Air Leg Combined in One (1)

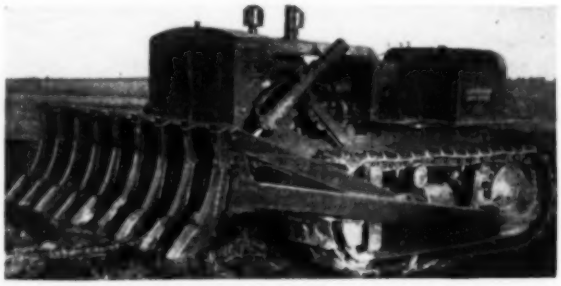
Newly announced Ingersoll-Rand Universal JR-38 Jackdrill is an air-leg rock drill combination designed as a completely integrated unit with a built-in air coupling between the drill and the feed leg that does away with the third hose previously necessary. It can be used either as a drifter, stoper or jackhammer, with detaching the feed leg from the drill by simply loosening the coupling nut the only adjustment necessary for its use as a jackhammer. Other unusual features cited by the maker are the control valve for feed-leg pressure built into the drill's backhead where it is always convenient to the operator, and shutoff of feed-leg pressure with the throttle valve controlling the drill, which eliminates pressure adjustment every time the drill is moved for another hole. Circle 1 on the postage-free card facing p 124 for additional information in Bulletin 4136-A available without obligation from Ingersoll-Rand Co., New York 4.

Versatile Unit Travels up to 30 MPH (2)

New Lorain Moto-Crane Model MC-524 has a 30-ton lifting capacity, features 10 speeds forward and two reverse for highway speeds up to 30 mph and is convertible to a shovel in the 1-yd class, crane, clamshell, dragline or hoe. Its tractive design permits travel over soft ground and rough terrain and it is powered by either gasoline or diesel engines. A Lorain Self-Propelled Model SP-524, built for more limited travel needs, features the same basic 30-ton turntable, has four speeds in both directions for a top speed of 7½ mph and is available as a crane and dragline only, with either gasoline or diesel power. Both units are equipped with bigger crane booms of sturdier construction that can be extended to 100 ft in length, plus addition of a 25-ft tip extension. Design gives greater lifting capacity without outriggers to combine instant travel with heavy-duty lifting, the maker says. Full details from Thew Shovel Co., Lorain, Ohio.

More Power for 1953 Truck Line (3)

The 1953 Chevrolet truck line, increased to 74 models on 11 wheelbases, features, among other things, greater horsepower and chassis strength, and sizes from a sedan delivery on a 115-in wheelbase to a 54-passenger school bus with a 212-in wheelbase to meet virtually every hauling need, the maker says. Improved performance, stronger frames and axles, better braking and increased generator capacity are some of the 1953 highspots cited. The two engines of economical valve-in-head design include the 108-hp Loadmaster, standard in some models and optional in others, which has been re-designed throughout and increased in power. The Thriftmaster, also improved at several points, is standard on the lighter trucks. Full details from Chevrolet Motor Div., Detroit 2.



Clearing Rake Uses Adjustable Teeth (4)

Rockland heavy-duty land-clearing rakes, effective for all types of land clearing according to the maker, come equipped with an optional number of removable and replaceable teeth, the spacing of which can be changed to fit operating conditions of the job at hand. Pusharms are furnished complete with all connections for cable or hydraulic operation, or the rake front may be secured separately to fit any standard pusharm. Teeth are capped with replaceable wear-resistant points and provide a 15-in penetration. Size and weight of rake depends on tractor model, and they are interchangeable with any make or model dozer, the company says. Circle 4 on postage-free card for full information from Shirley Equipment Co., 26 Elton St., Providence 6, R. I.

at Mines #3 and #8 Penna. Coal & Coke Co.

Continuous Miners are used throughout these mines — and tough Kennametal U4H Bits do all the cutting. Mine officials installed them 100% after trying all available makes of carbide bits. Kennametal delivered the lowest bit cost on record: $.0110 per ton — 65% less than any other carbide bit!

Remember that ability to cut more coal is not the only reason Kennametal is used by cost-conscious mines. Savings in power output, reduced costs for resharpening and reconditioning, more efficient functioning of machines and men are all possible through proper use of Kennametal Bits. Together, they can bring about a lower cost per ton that could be important to you, in *your* mine.

Kennametal Bits consistently produce new records in cost reduction because (1) their hard Kennametal tips have shock-and wear-resistant qualities superior to any other tungsten-carbide in the industry and (2) they are sold by veteran mining men who gladly go into the mine to demonstrate the right bit for the job. Get in touch with your Kennametal Representative today!

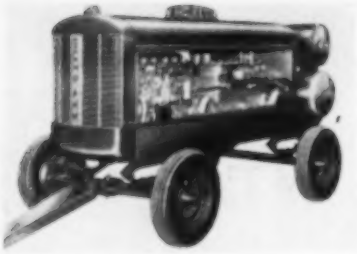
KENNAMETAL®

KENNAMETAL INC., MINING TOOL DIVISION
BEDFORD, PA.

General Offices and Main Plant at Latrobe, Pa.

World's Largest Manufacturer of Tungsten-Carbide

Drill Bits, Cutter Bits, Roof Bits, Rock Bits, Strip Bits



PORTABLE COMPRESSOR (5)

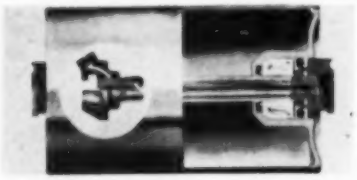
New Schramm Dezoil 210-cfm portable diesel-engine-driven compressor is designed for use where initial cost and fuel economy is essential, the maker says. In addition to economies in diesel fuel, the unit also features the Pneumastat control which operates the compressor from part to full capacity without loading or unloading for fuel savings up to 50%, it is said. The Schramm Dezoil engine also is available for operation of the Model 105 Pneumatractor and the Model 105 Pneumapower compressors. More details in Bulletin DTT-52 from Schramm Inc., West Chester, Pa.

DRIVE-ON BELT FASTENER (6)

"Turtle" drive-on conveyor-belt fasteners feature a new and improved design that permits tight, speedy and simple repair and joining of belts with use of only a mechanic's hammer. Repairs and joints can be made on the job without prepunching holes to guide the teeth, and no special machinery or equipment or trained personnel are needed, the maker says. The Turtle fastener is presently available in one size for repairing belts ⅜ to 9/16 in thick and for joining medium-duty belts 7/16 to 9/16 in thick. Bulletin T-600 from Flexible Steel Lacing Co., Chicago 44.

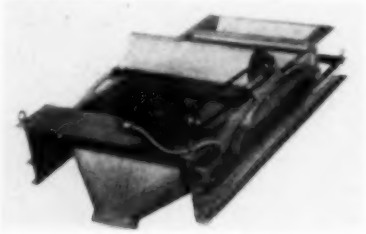
LOW COST CHAIN SAW (7)

New Model 110 portable electric chain saw is priced at $99.50 yet furnishes sufficient power and speed for a wide variety of tough wood-cutting jobs, the maker says. The one-man Porter-Cable saw weighs only 18 lb and is equipped with a 14-in cutter-bar said to easily fell trees up to 28 in in diameter. The special design of the log-gripping teeth hold the saw against the work and reportedly permits the machine to spike and feed itself completely without jamming or pushing by the user. It is driven by a standard universal AC-DC 115-v motor and gasoline-driven portable generators also are available. Bulletin A-943 with full data from Porter Cable Machine Co., Syracuse 8, N. Y.



UNIT-SEALED BELT IDLER (8)

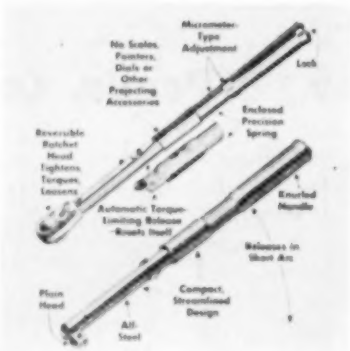
New Continental Type UST unit-sealed prelubricated belt-conveyor idler incorporating Timken bearings and Garlock Klozures is designed to operate for periods up to 3 yr or more without relubrication for savings in grease, labor and belts, the maker says. The unit bearing assemblies are "sealed into themselves" and reportedly prolong belt life by preventing grease migration through seals onto the belt. An ample but not excessive grease reservoir effects a saving on grease, and when necessary the units can be easily relubricated or taken apart, cleaned, relubricated and returned to service for another extended period, it is said. Bulletin from Industrial Div., Continental Gin Co., Birmingham 2, Ala.



SMALL VIBRATING SCREEN (9)

New 24 x 36-in Uniflex high-speed vibrating screen is available in single- or double-deck, open or totally enclosed construction for a variety of screening operations. The standard unit, weighing 150 lb, is equipped with feed pan and discharge chute, ½-hp motor, starter switch and V-rope drive, for either floor mounting or aerial suspension. The unit, which has an over-all size of 31 x 53 x 15 in, also is available with a gasoline-engine drive. Bulletin 65 with more details available from Universal Vibrating Screen Co., Racine, Wis.

Equipment Shorts You'll Want to Check



(10) TORQUE-LIMITING WRENCH—New Proto precision torque-limiting wrench, which releases automatically at the proper setting without the usual external indicating devices, has been announced by the Plomb Tool Co., Los Angeles. Desired torque is set by turning the handle, like a micrometer. When the right torque is reached, the wrench releases automatically and signals the operator with a positive reflex action. Upon removal of hand pressure, the torquer resets automatically. It is available in six sizes, three of which have a built-in reversible ratchet head that does the work of both a ratchet and torque wrench.

(11) PLASTIC-PIPE JOINT INSERTS now are available to provide flexible pipe users with a simple, positive method of joining pipe sections with standard Victaulic couplings. The Victaulic plastic insert serves as a stiffener to support and maintain the plastic pipe ends to accommodate the Victaulic coupling, and tests show the joint to be stronger under bursting pressure than the pipe itself, the maker says. Circle 10 for details from Victaulic Co. of America, Elizabeth, N. J.

(12) HAND-SIZED TRANSMITTER—Motorola Handie Micro-Talkie Transmitter designed to operate in the 152-174-mc frequency band weighs only 1 lb

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Where failures meant shutdowns they changed to grommet belts

B. F. Goodrich grommet V belts last 20 to 50% longer

Crushing rock puts terrific shock loads on the V belts that drive the crusher. When the drive stops because of premature belt failure, the whole operation shuts down, deliveries are delayed. The stone company wanted reliability—and got it—when a set of B. F. Goodrich grommet V belts was installed. In spite of the shaking, jolting action, the grommet V belts on this crusher have already given two years of trouble-free service, and are still in excellent condition. Here's why B. F. Goodrich grommet V belts outlast and outperform ordinary belts.

No cord ends

A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength

All of the cord material in a B. F. Goodrich grommet belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. There are no layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced. And grommet V belts stretch less—only ⅓ as much, on an average, as ordinary V belts.

Better grip, less slip

Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

They cost no more

Grommet V belts cut costs because they last longer, increase production because machines keep running with fewer interruptions, reduce maintenance costs because they need less attention, yet they cost not one cent more. Available in C, D and E sections. But remember, only B. F. Goodrich makes the grommet V belt (U. S. Patent No. 2,233,294), so to get all these savings, call in your local BFG distributor the next time you need V belts, or write *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.* (Available in Canada)

Grommet V-Belts BY

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- To assure highest quality, all stages of wire manufacture and rope fabrication are closely controlled.
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- In designing and manufacturing its thousand and one wire ropes, Macwhyte exercises all the special care that assures long service and low cost to you. May our engineers recommend the right rope for *your* equipment?

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13 oz and features a tested optimum range up to 5 mi for a variety of industrial uses. The complete transmitter, including self-contained dry batteries and microphone, is contained in a 7⅝ x 2½ x 1⅝-in case. To transmit, it is only necessary to press a button on the side of the unit. More details from Motorola, Chicago 51.

(13) SMALL VIBRATORY FEEDER for specialized uses, the Syntron Model F-00, has a wide range of feeding capacities up to 500 lb per hour of bulb material. This new model utilizes the same electromagnetic vibrating principle as its larger counterparts—which eliminates gears, bearings, belts, idlers, etc.—and measures 7¾ in high by approximately 14 in long, weighing 14 lb. Catalog data from Syntron Co., Homer City, Pa.

(14) NEW TYPE OF OVERLOAD RELAY, said by the maker to combine extremely high-speed operation under dangerous conditions with time delay for starting inrush, the Type C Silic-O-Netic relay, can be furnished with time-delay curves to match the characteristics of the protected equipment. Since the unit provides a definite high-speed response point at eight times rating, however, it fulfills a need for protecting hermetically sealed motors, electronic circuits and control systems which require fast protection at relatively low overload values, it is said. The relays are insulated for 440-v service with coil ratings from 1 to 100 amp and are furnished in tamper-proof phenolic housings with an over-all weight of only 6 oz. Bulletin 5101 available from Heinemann Electric Co., Trenton 2, N. J.

(15) UNIT HEATERS AND HEATER SECTIONS—New line of Wing electric heaters designed for applications where steam, hot water or gas are not available or economical are available in a wide range of sizes, the unit heaters delivering from 13,600 to 204,000 Btu per hour and the heater sections from 25,500 to 204,000 Btu per hour. Three types of unit heaters are offered: (1) ceiling-suspended downward-discharge heater with revolving discharge outlets for all building or rooms where personnel work; (2) ceiling-suspended downward-discharge heater with stationary discharge outlets for storage sections, garages, loading docks, etc.; and (3) horizontal-discharge heater with adjustable vanes, for relay stations, pumphouses, etc. They can be used for cooling in summer. Full details from L. J. Wing Mfg. Co., Linden, N. J.

(16) RUSTY-STEEL PRIMER—Rustbond paint primer, said to cover and adhere to rust, acting on it slowly to chemically and mechanically bond steel, rust and primer together, was developed primarily to stop the peeling of polyvinyl chloride finishes from rusty steel but works well as a primer for rubber-base, neoprene and other corrosive-resistant coatings, the maker says. Applied by brush, Rustbond Primer reportedly adheres almost perfectly to rusty steel, to rust or to sandblasted steel surfaces, covering sharp and rough edges as heavily as flat surfaces, but doesn't adhere to smooth shiny steel unless thoroughly aged. It stops further rusting and adheres even better on aging. Bulletin from Carboline Co., St. Louis 5.

(17) COMPACT BUCKET ELEVATOR for loading feeder storage hoppers in limited areas, new Omega Model BES-77, houses its malleable iron buckets in a 9 x 24-in steel casing which is said to be considerably smaller than the average-size elevator currently available. Driven from a 1½-hp gearhead motor, the feed buckets travel on pintle chain from boot to head for a maximum delivery of 200 cu ft per hour. Bulletin 77-J7 from Omega Machine Co., Providence, R. I.

(18) COMPACT TYPEWRITER with all the features of the office-size typewriter, at a considerable saving in cost, is designed to meet the needs of the small business and professional office, the maker says. Known as the Remington Rand Office-riter, it features a full 11-in carriage with a 10$\frac{9}{10}$-in writing line and a full-size standard 42-key 84-character keyboard for handling general business typing requirements. For full information, Booklet WT611 from Remington Rand Inc., New York 10.

(19) DUPLICATING MACHINE—Specially suited to reproducing forms, bulletins, notices and other short-run material, new Model 220 A. B. Dick spirit duplicator, an automatic-feed hand-operated model, is designed to provide low-cost office reproduction by untrained personnel with a minimum of instruction, the maker says. The gravity air-lock principle utilized in the moistening system, combined with a positive paper-feeding system, reportedly results in low fluid consumption and reduction of paper wastage to provide low operating costs. Bulletin from A. B. Dick Co., Chicago 31.

EQUIPMENT BULLETINS AVAILABLE

(30) IF YOU ARE THINKING ABOUT A NEW MINE SHOP, office, pumphouse, etc., you may find it profitable to request the new 24-p Booklet BC-521 on Steelcraft standard steel buildings offered by the Steelcraft Mfg. Co., Rosemoyne, Ohio. The booklet shows the many applications of the four types of standard construction, and their flexibility and economy for a wide range of building requirements. Construction and installation details are discussed and diagramed, with full data on accessories, dimensions and specifications.

(31) CONTROL CENTERS—A new 31-p Application Booklet B-5621 on control centers is available from the Westinghouse Electric Corp., Pittsburgh 30. Stressing the case for centralizing all controls of an entire system in one group of enclosures, the booklet discusses the characteristics of control centers that make for flexibility of application, ease of servicing and operating safety. Three types of control centers and their electrical components are described, and selection charts and reference tables are provided.

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THE EDITOR, COAL AGE

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(22) **RESISTORS**—New Bulletin 942-B describes the complete line of EC&M Welded Plate resistors for ratings up to 150-amp-continuous without internal paralleling of the grids in the section. Construction details and capacity tables are included, along with full information on the newly developed Tab-Weld-X sections. Available from the Electric Controller & Mfg. Co., Cleveland 4.

(23) **CLOSE-COUPLED PUMP**—Construction and operating features of A-C supporting-adapter-type close-coupled general-purpose pump in capacities to 2,500 gpm at heads to 550 ft are detailed in new Bulletin 52B6083A released by Allis-Chalmers Mfg. Co., Milwaukee 1. Compact and requiring a minimum of space, the pump is available in a choice of materials and either packing or mechanical seal, taking only four bolts plus electrical and pipe connections for installation without a special foundation, the bulletin states.

(24) **PLASTIC-PIPE PERFORMANCE**—Authoritative data on head loss from friction in Carlon plastic pipe, now available in charts and graphs, are based on a combination of Carlon's own experience and a compilation of data derived from a thorough check of flow properties by foremost hydraulic laboratories. The graphs covering water flow vs head-loss for both Carlon plastic pipe and steel pipe show that the flow characteristics of Carlon are from 50 to 60% better, it is said. Data available from Carlon Products Corp., Cleveland 5.

(25-26) **AIR AND WATER SUCTION HOSE**—B. F. Goodrich Co., Akron, Ohio, offers two separate catalogs, each with full details of construction, applications and specifications. Circle 25 on the postage-free card for Bulletin 4600 describing four types of Goodrich water-suction hose said to cover all suction-hose service. For Bulletin 3460 describing five grades of air hose featuring tough oilproof covers to prevent peeling, Circle 26.

(27) **COAL CHEMISTS** and others who do precision weighing will find interesting and helpful a new 32-p booklet entitled "Care and Use of Analytical Balances," available without charge from Christian Becker, Div. of Torsion Balance Co., Clifton, N. J. The booklet includes information on how to choose the proper location for a balance, how to assemble and mount it, techniques applied in determining weight and checking sensitivity, operation of a balance and general precautions that should be observed.

(28) **POWER-TRANSMISSION**—Half a century of steady development and growth is described in the golden anniversary issue of its magazine, Transmission Topics offered by the Fuller Mfg. Co., Kalamazoo, Mich. Depicting achievements of years gone by with photographs from old albums of early and modern motor trucks and mobile machines and ancient and futuristic highways, the magazine tells of the phenomenal progress which has been gained during the past 50 yr. It also relates how Fuller pioneered in the development of heavy-duty transmissions, helping set the pace for the introduction of better mechanized equipment capable of doing more work more efficiently.

(29) **FREEZEPROOFING COAL SHIPMENTS**—Brief CoB-1 "Freezeproofing Coal with Calcium Chloride," a handy reference for use in preparing calcium-chloride solutions, contains general instructions, procedures, equipment recommendations and methods for preparing coal shipments in coldest weather. Offered by Calcium Chloride Institute, Washington 6, D. C.

(30) **DUMP BODIES**, hydraulic hoists and end-loaders are covered in Catalog L-6312 offered by the Galion Allsteel Body Co., Galion, Ohio. An unusual feature is a handy reference table which permits the user to easily select the exact hoist and body best suited to his needs. Full data are included on equipment ranging from light-duty pick-up truck units to huge twin-telescopic 3-stage tandem-axle trailer dumps.

(31) **HOSE COUPLINGS**—Bulletin describes how Le-Hi Quick-Lock hose couplings and fittings are coupled and uncoupled in half a second or less on air, water, gas, oil, hydraulic or steam lines, providing a tight seal under all working pressures from 10 to 2,000 lb in hydraulic service, or 1,500 lb in nonpoisonous nonflammable gas service. Bulletin covering six types from Hose Accessories Co., Philadelphia 32.

(32) **DUST COLLECTION** in mining and metallurgical operations is discussed in Bulletin 402 offered by American Wheelabrator & Equipment Corp., Mishawaka, Ind. Case histories show how Dustube cloth-tube-type collectors are used in filtering gases and in dust control in coal cleaning, and how synthetic fabrics are employed in the filtration of hot or corrosive gases.

(33) **POWER-TRANSMISSION EQUIPMENT** in its complete line is covered in new 36-p Catalog R-103-A issued by Rockwood Pulley Mfg. Co., Inc., New York 13. It includes descriptions and list prices for such Rockwood products as V-belts, detachable-link V-belting, pulleys, sheaves, roller chain, belt lacing, speed reducers and others.

(34) **STEEL BUILDINGS**—24-p booklet describing the economy, versatility and easy erection of a Soule Steeline building is available from the Soule Steel Co., San Francisco 24. Adaptable to many uses, the clear-span rigid-frame factory-produced Steeline buildings are available in various widths from 32 to 70 ft and lengths of 20-ft multiples and may be widened by combining two or more buildings. Any arrangement of windows and doors is possible, it is said.

(35) **FILTERS**—Bulletin F9-B3 from the Denver Equipment Co., Denver 17, covers design features, dimensions and capacities of the Denver disk filters, designed to eliminate filtrate throwback and produce a drier filter cake.

(36) **LOCKNUTS**—24-p booklet from the Locknut Sec., Industrial Fasteners Institute, Cleveland 15, contains descriptions and operating principles of representative types of lockmuts made by various manufacturers and is designed to help the reader in selecting and using the most effective type of locknut for his needs.

(37) **CARBON-MONOXIDE DETECTORS** for permanent automatic installation in areas where dangerous concentrations may occur are described in Bulletin 201 from Taller & Cooper, Inc., Brooklyn 1, N. Y. The units can be adapted for combustible or explosive gases, the maker says.

(38) **TRUCK TORQUE CONVERTERS**—How truck-type three-stage hydraulic torque-converter drives improve performance, prolong equipment life and prevent operator fatigue is discussed in Bulletin 501 offered by the Twin Disc Clutch Co., Hydraulic Div., Rockford, Ill. Application of the two models available for heavy duty on-highway and off-highway units and the dual advantages of highest torque multiplication for pulling and torque-converter braking, exclusive in Twin Disc converters, are covered thoroughly.

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The Mine Supply Co., Inc.
Terre Haute, Ind.

KENTUCKY
General Electric Supply Corp.
Harlan, Ky.
Kentucky Mine Supply Co., Inc.
Harlan, Ky.

MISSOURI
Tools & Supplies, Inc.
St. Louis 3, Mo.

NEW MEXICO
El Paso Saw & Belting
Carlsbad, N. M.

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Cambridge Machine & Supply Co.
Cambridge, Ohio

PENNSYLVANIA
Whiteman Division, National Mine Service Co., Indiana, Pa.
Fairmont Supply Co., Washington, Pa.

TENNESSEE
W. J. Savage Co., Knoxville, Tenn.

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El Paso Saw & Belting, El Paso, Texas

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CC-1
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AD-28
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Dual-purpose

AD-30
1⅞"-dia. AUGER DRILL BIT
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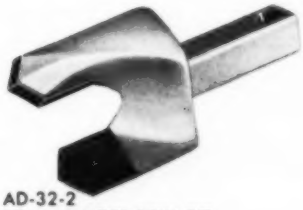
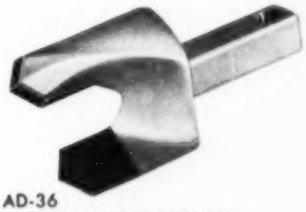


AD-32-2
2"-dia. AUGER DRILL BIT



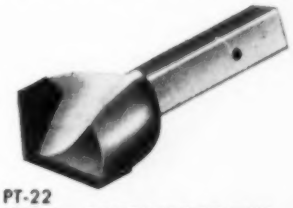
AD-36
2¼"-dia. AUGER DRILL BIT

NEW

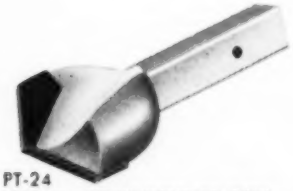
AD-40
2½"-dia. AUGER DRILL BIT
Extra-duty hex shank

NEW

AD-44
2¾"-dia. AUGER DRILL BIT
Extra-duty hex shank



PT-22
1⅜"-dia. ROOF BOLTING DRILL
Solid type



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1½"-dia. ROOF BOLTING DRILL
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APT-22
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PROSPERITY IN THE USA: How Wealthy Are We?

Again, how prosperous *are* the people of the United States?

This is the third of a series of messages devoted to this crucially important and much-debated question. The first two messages dealt with what has been happening to our national income, both in terms of its growth and how it is divided among individuals.

This third message deals with what has been happening to the resources—factories, farms, mines, and equipment of all kinds—out of which income is created. It deals with what economists call our wealth.

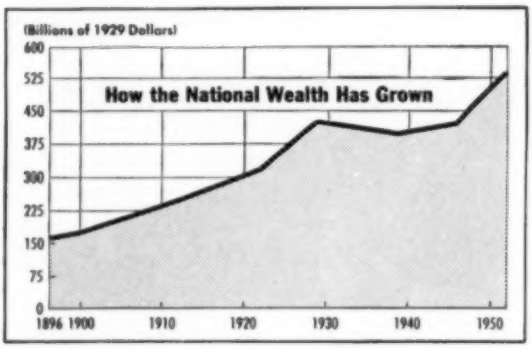
It is possible for a nation to enjoy apparent prosperity for a time by rapidly exhausting its resources. But to sustain prosperity over the long pull a nation must see that its wealth is not dissipated. Hence what is happening to our wealth now is a harbinger of what is going to happen to our prosperity later on.

How Wealth is Measured

It is often asserted that the most vital element in a nation's wealth is its people. There is a lot in this idea. For example, the full value of a country's hospital and surgical equipment depends on its physicians and their skill in handling the equipment.

However, no one has ever devised a satisfactory way to put a value on human beings. So people are omitted from calculations of national wealth. So, too, is military equipment. It is regarded as basically destructive and hence not a real addition to wealth. Otherwise, the wealth of a nation is calculated in terms of the dollar value of its physical resources.

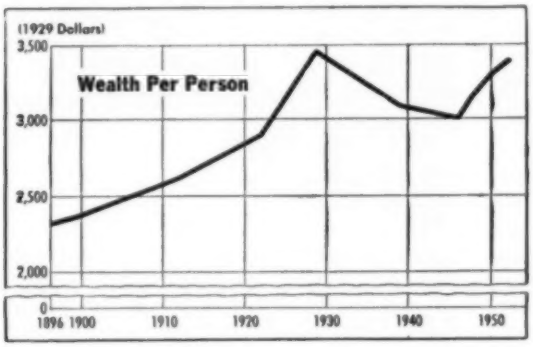
The following chart shows the wealth of the U.S.A. at various intervals during the past 50 years. For the period through 1948 the figures come from a pioneering study by Raymond Goldsmith of the National Bureau of Economic Research, which is widely regarded as the foremost organization in its field. The figures since 1948 are estimated. To remove the effect of price changes, all of the wealth figures are calculated in 1929 prices.



From this chart one fact stands out clearly. It is that since 1929 our national wealth has not been increasing as steadily as it did during

earlier periods. Indeed, in 1946 our total national wealth was actually less than it was in 1929. Only in the last six years have we been able to make any consistent additions.

Even these gains are less impressive when the growth in our population is taken into account, as illustrated by the following chart.



This chart makes it clear that when the nation's wealth is divided by the population, we are slightly worse off per person today than we were in 1929. This is the case in spite of the large additions to our national wealth since 1946.

Depression and war are the two principal reasons we have made no progress in increasing our wealth per person since the 1920s. The depression brought mass unemployment and greatly reduced production which ruled out any increase in wealth. During World War II and again during the post-Korean mobilization program, U.S. production has reached new peaks. But a considerable portion of this record breaking output has been in the form of military equipment, which is not included in an accounting of national wealth. Consequently, we have been unable to regain the level of wealth per person which we had in 1929.

A Brake of Prosperity

What does this failure to raise our wealth per person mean? It means that we have fewer resources with which to create income for each individual. It means that we have made no progress in the crucial task of assuring future increases in prosperity.

As the second editorial in this series demonstrated, we have gone so far in equalizing individual incomes that "the possibilities of increasing the income of the rest of the people by 'soaking the rich' have largely disappeared." From now on the only promising way to increase our individual incomes is to increase our national earning power.

During the past four years it has taken about $3.60 of national wealth to yield $1 of income after taxes. This is a low figure for the wealth needed. Prior to World War II there were long periods when it took at least $5 of national wealth to produce $1 of national income. The experts in this field are by no means certain that it will not again take $5 rather than $3.60 of wealth to increase income by $1.

But let us assume that $3.60 of wealth will suffice to provide $1 of income in the years ahead. If by 1960—seven years from now—the income of the average American is to be increased from about $1490, where it stands at present, to $2000, we must add $310 billion to the national wealth. This is nearly three times as much as we have added to our wealth since the end of World War II, seven years ago.

Because we have made large additions to our productive equipment in recent years, fears are frequently expressed that we shall soon be plagued by an excess of such equipment. But the facts about our national wealth do not support this conclusion. They indicate that we still have ahead of us a tremendous job of increasing our resources if the American standard of living is again to resume the steady climb which was interrupted by depression and war.

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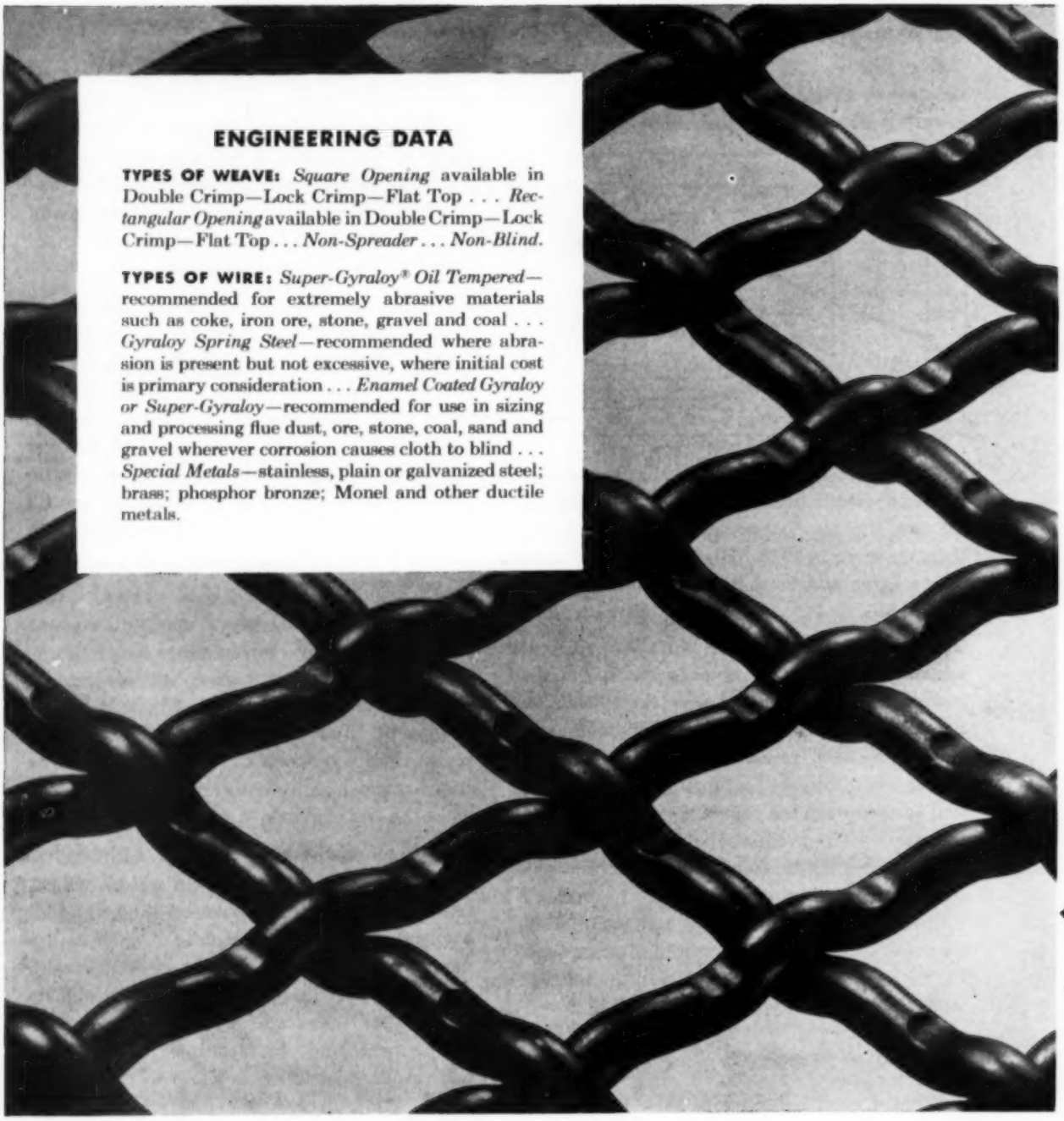

ENGINEERING DATA

TYPES OF WEAVE: *Square Opening* available in Double Crimp—Lock Crimp—Flat Top . . . *Rectangular Opening* available in Double Crimp—Lock Crimp—Flat Top . . . *Non-Spreader* . . . *Non-Blind.*

TYPES OF WIRE: *Super-Gyraloy® Oil Tempered*—recommended for extremely abrasive materials such as coke, iron ore, stone, gravel and coal . . . *Gyraloy Spring Steel*—recommended where abrasion is present but not excessive, where initial cost is primary consideration . . . *Enamel Coated Gyraloy or Super-Gyraloy*—recommended for use in sizing and processing flue dust, ore, stone, coal, sand and gravel wherever corrosion causes cloth to blind . . . *Special Metals*—stainless, plain or galvanized steel; brass; phosphor bronze; Monel and other ductile metals.

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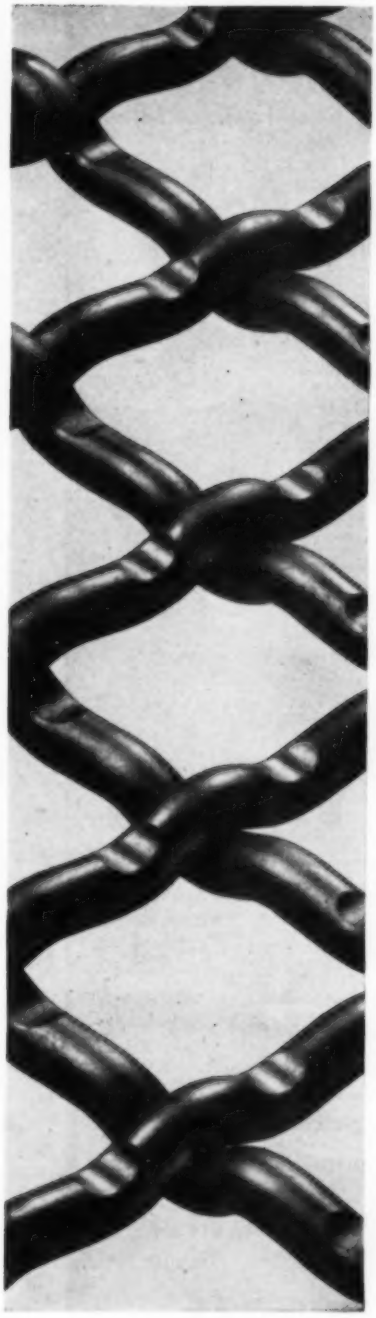

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Single Roll Rockmaster Crusher for both primary and secondary crushing. Used for crushing mine refuse, sulphur balls, sand rock, slate, etc. *Bulletin RM-505.*

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McLanahan Double Roll Crusher for various reductions of medium-size [illegible]. *Bulletin DR-447.*

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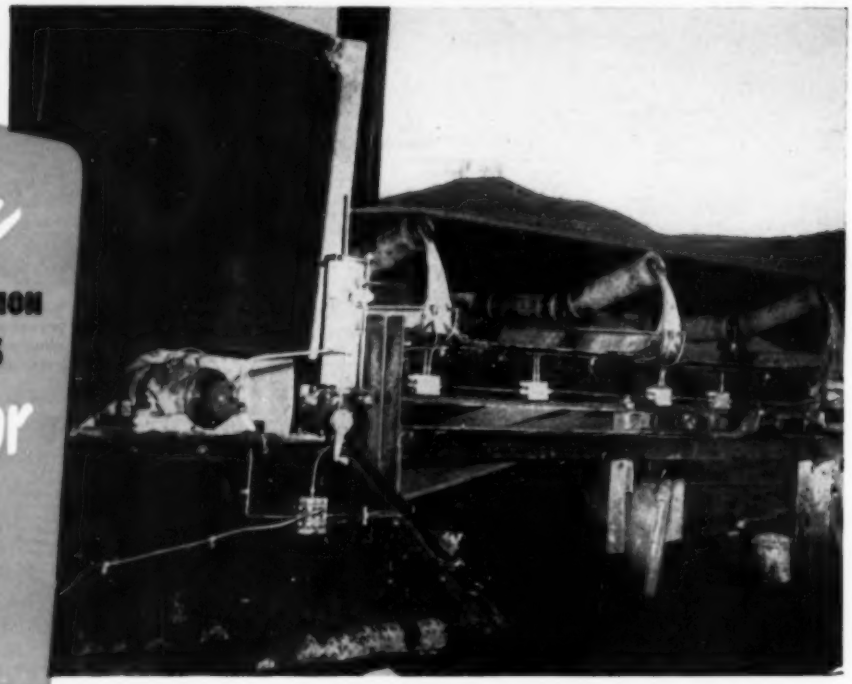

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The long list of satisfied repeat customers we have are the best reason why there are more Trabon Automatic Lubrication Systems in industry than all other makes. We'll be glad to give you their names.

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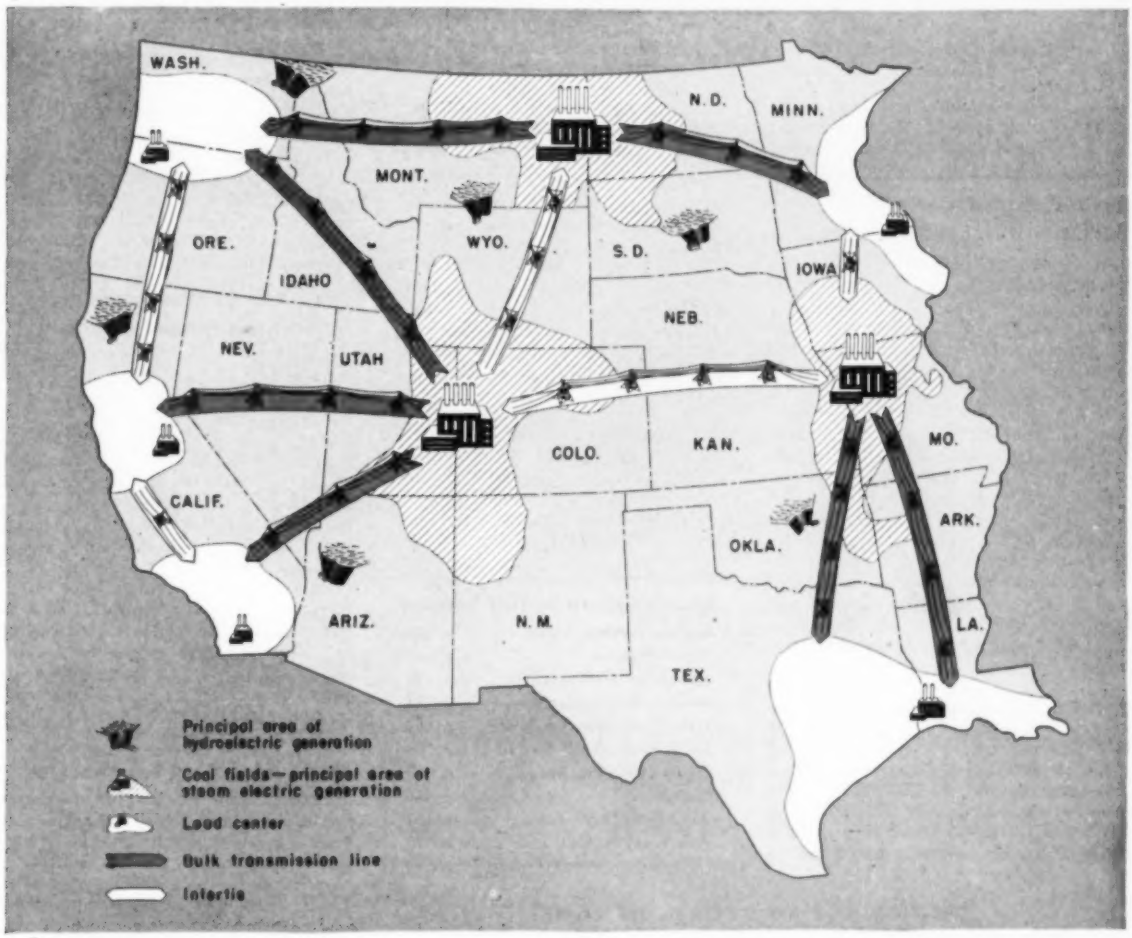
News Round-Up



Long-distance transmission of coal-generated energy seen by Bureau of Reclamation, as it says . . .

Coal Must Power the West

A HEFTY BOOST TO COAL as the major source of future power for the West over a revolutionary long-distance electrical-transmission system was the keynote of a study made public Dec. 31 by the Bureau of Reclamation of the U. S. Department of the Interior.

The 30-p "Study of Future Power Transmission for the West" estimated the growing power needs of 22 states from Minnesota and Louisiana to the West Coast and said that long-range planning was required "if adequate and economical facilities are to be ready when needed." By 1975, coal will be the source of 55% of the West's electrical energy, with water providing 38%, the study estimated. In 1950, coal produced 9.5% of the demand and hydroelectric plants 52.3%, it said.

Seen by the report are huge steam-generating plants of 1½ to 2 million kw located in the major coal fields from which 500,000-v lines would carry the power 400 to 660 mi to consumers. The highest line now in operation is one of 380,000 v carrying power 600 mi.

The steam plants would be interconnected with hydro plants throughout the West to provide an integrated power system designed to meet peak loads while conserving both fuel and water resources.

While detailed costs of such a system were not included, the proposed method was estimated as at least 18% less expensive than shipping coal by rail to

Sources of Power for the West

	Coal		Water		Oil		Gas	
	Billion Kw-Hr	Per Cent of Total	Billion Kw-Hr	Per Cent of Total	Billion Kw-Hr	Per Cent of Total	Billion Kw-Hr	Per Cent of Total
1950	10	9.5	55	52.3	5	4.7	35	33.5
1975 (Est.)	300	55.0	215	38.0	5	1.0	35	6.0

consuming centers. In his letter of transmittal published as part of the study, Michael W. Straus, commissioner of the Bureau of Reclamation, said that it was contemplated that both public and private power agencies in the area would construct the proposed transmission system. Initiation of sound long-distance programs for the development of hydro and fuel resources and transmission facilities, as recommended by the President's Materials Policy Commission, "should no longer be postponed to 'tomorrow,'" he stated, in emphasizing its importance.

In citing the place of coal in the future economy, the report said: "It is increasingly apparent on the basis of presently known resources and technology that coal is the logical fuel for production of electrical energy to supply that portion of the western load by 1975 and later that cannot be met by feasible hydro development. The major problem is in determining the best method of delivering the energy stored in coal to the large load centers."

News Briefs and Trends

Second State-Federal Plan For Mine Inspection Reported

A cooperative plan for the joint examination of coal mines by federal and state inspectors under the provisions of the Federal Coal Mine Safety Act passed last year has been entered into by the State of Washington and the USBM, it was announced Jan. 19. A similar plan, the first under the law, was made with the State of Wyoming last September. Under the agreement, all inspections of Washington coal mines covered by the Act will be made jointly by federal and state inspectors except in emergencies where no state representative is on hand to participate. All coal-mining states have been asked to submit state plans and the Bureau hopes that all states will participate, John J. Forbes, director of the USBM, said in making the announcement.

Britain's Output up Some; Tonnage per Man Slides off

Great Britain closed the year with an estimated output of 224,939,200 long tons, as compared with 222,256,500 in 1951. Although ahead of the previous year, 1952 production was over 1 million long tons short of the target set early in the year and reflected a drop in output per man. Opencast mining, exceeding earlier estimates, produced 12,108,500 long tons in 1952, as compared with 10,985,800 long tons in 1951. Deep-mined output of 212,830,700 long tons, although 1,560,000 tons over 1951, was thought disappointing when the higher manpower available and the improved equipment and methods installed were considered. Over the first 51 wk of 1952 average weekly manpower was 715,300, as compared with 698,600 in 1951. Output per man-shift for all workers fell from 1.21 tons in 1951 to 1.19 in 1952. Although men working at the face rose by some 12,000 during the year, output there fell from 3.17 to 3.15 tpm. Disputes in the nationalized industry cost an estimated 1,200,000 tons during the year and rejection of a wage demand caused some slackening in effort. In addition, voluntary absenteeism rose slightly in 1952 and weekend working was not as well supported as previously, it was reported. A wage increase of 4 shillings (56¢) was rejected Jan. 22 by leaders of the British miners after the National Coal Board said productivity was so low no larger boost could be made. The mine chiefs, who had dropped their original demand of 30 shillings to 6 shillings weekly during negotiations, have said that they will take no action on continuing the Saturday work shift when the contract expires at the end of April. Return to the 5-day week would be a serious blow to Britain's coal output.

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Lewis Okays New Labor Head; Ignores Retirement Question

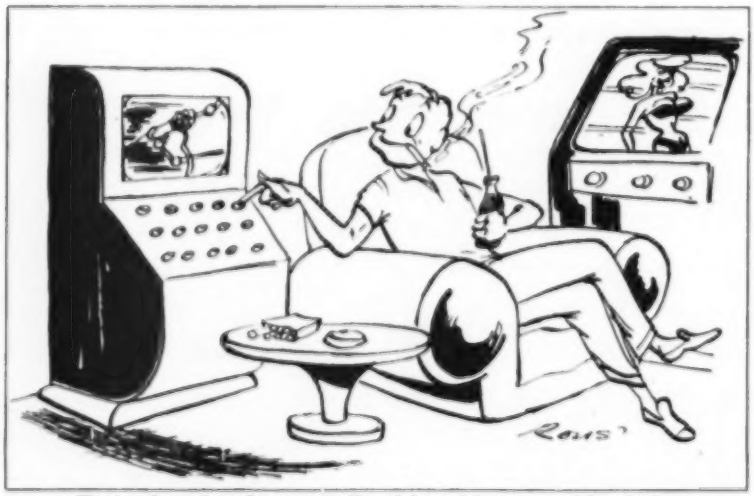
John L. Lewis, UMWA president, interviewed on his return from South America Jan. 5, said Martin F. Durkin should be confirmed by the Senate as the new Secretary of Labor. While commenting on several subjects, Mr. Lewis refused to answer questions regarding his possible retirement as the UMWA head. Reminded of Sen. Taft's reaction to Mr. Durkin's appointment, Mr. Lewis said that the Senator was opposed to any bona fide representative of labor serving in the Cabinet. He again called for the full repeal, rather than amendment, of the Taft-Hartley law as "a pestilence and a scourge." The federal wage and price control setup is a "farce" and controls had been "utterly without value," he told reporters.

N&W Adds Coal Locomotives

Authorization for the construction of 15 more modern coal-burning locomotives and 2,000 new freight cars was recently announced by the Norfolk & Western Ry. The switching engines are similar to another order of 15 units now under construction at the company's shops in Roanoke, Va. On completion of the orders, the N&W will have 75 such units.

(Continued on p. 175)

Maybe not so crazy, at that!



The American miner of tomorrow will work by push-button control from his home

Reprinted from French magazine, *Mineurs*

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"Cost Cutting Today"

To assist coal companies who wish to distribute copies to key supervisors and officials as a stimulus to their own program of cost reduction, we have reprinted the 14-p "Cost Cutting Today" article in January *Coal Age* in a special pamphlet. These reprints are available, postage paid, at 20c each for more than 100 copies; and 25c in quantities up to 100. A sample copy will be sent on request, without charge. Address: The Editor, *Coal Age*, 330 W. 42 St., New York 36, N. Y.

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MODERN P & H ELECTRIC SHOVEL with electro-magnetic type clutch and P & H stepless power regulation—Harnischfeger Corporation, 4400 W. National Avenue, Milwaukee, Wisconsin.

Mr. Strip Miner:

"WHAT'S A GOOD SHOVEL WORTH?"

In today's market, the cost of a large, modern electric stripping shovel runs somewhere in the neighborhood of a quarter of a million dollars! A tidy sum indeed!

But aside from the initial dollars invested, your strip shovel is the key to your operation . . . the hub around which your operation revolves. When it's out of action, it leaves a tremendous hole in your production parade . . . a gaping hole that's immediately reflected in dollar profits.

We're sure you'll agree that your strip shovel is certainly worth every effort and expense necessary to see that its many vital moving parts are efficiently and expertly lubricated.

THAT'S WHERE THE COMPLETE LINE OF CITIES SERVICE LUBRICANTS CAN SERVE YOU. Cities Service offers one-source lubricant buying for you. There is a Cities Service Lubricant for every lubricating point on your shovels . . . electric motors, bearings, gears, cables. Actually, the complete Cities Service Line can cover all your needs in all mining operations . . . from the lubrication of locomotives, mine cars, tractors and motor trucks, right down to tempering and quenching oils that may be required in your equipment repair shop.

Why not try the Cities Service one-source plan? You'll find it saves time in buying, cuts equipment down-time, and adds dollars to your profit column. Call your nearest Cities Service office or write Cities Service Oil Company, Dept. B5, Sixty Wall Tower, New York City 5, New York.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

CONTINUOUS MINING—Herman L. Thomas (left), mining sales division, Jeffrey Mfg. Co.; L. S. Ahlen, district manager, Goodman Mfg. Co.; and John A. Stachura, superintendent, Enoco Collieries, Inc. **COAL PREPARATION, SAFETY**—R. S. Peterson (left, right photo), chief electrical engineer, Templeton-Matthews Corp.; M. A. Matthews, president, Templeton-Matthews Corp.; Fred Conrad, chief inspector, Lynch Coal Operators' Reciprocal Association; and Carl Donie, superintendent, Little Betty Mining Corp.

Mining Advances Indiana Theme

Continuous-mining accomplishments and prospects, preparation progress and plant operation, and safety underground discussed at midwinter meeting of the Indiana Coal Mining Institute.

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

THE POSSIBILITIES of the continuous miner in coal production, and coal preparation and safety were featured at the winter meeting of the Indiana Coal Mining Institute, held at the Terre Haute House, Terre Haute, Jan. 10. Over 175 representatives from coal companies and equipment manufacturers attended the session.

Birch Brooks, manager of operations, Walter Bledsoe & Co., Terre Haute, Ind., and first vice president of the institute, presided at the sessions. C. C. Lydick, managing director, Coal Trade Association, Terre Haute, was toastmaster at the banquet Saturday evening. C. Richard Templeton, assistant to the president, Templeton Coal Co., Terre Haute, spoke to the group about his experiences while in Germany with a six-man technical group representing the Mutual Security Agency.

Comparison of German mining with that in the United States is impossible, Mr. Templeton explained, because there is no basis on which to compare. One of the major problems in the Ruhr mining area is the high cost of developing a new mine—over 6 to 8 times as much capital is required as in the U. S. Equipment is considered an expense item and is

NEW ASSOCIATION OFFICERS—Second vice president, Joseph Anstead (left), Linton Summit Coal Co.; first vice president, G. Fred Bieler, Terre Haute, Ind.; president, Birch Brooks, manager of operations, Walter Bledsoe & Co.; secretary, Harvey Cartwright, commissioner, Indiana Coal Operators' Association; third vice president, Harvey Cruikshank, superintendent, Dresser mine, Walter Bledsoe & Co.

BANQUET SPEAKER—C. Richard Templeton, assistant to the president, Templeton Coal Co., discussed his experiences in Germany as a member of a MSA technical group working with German mines.

NEWLY ELECTED EXECUTIVE BOARD—A. G. Gossard (left), general superintendent, Snow Hill Coal Corp.; Colvin B. Burk, superintendent, Viking mine, Snow Hill Coal Corp.; L. S. Ahlen, district manager, Goodman Mfg. Co.; Placide Mayeur, superintendent, Princeton Mining Co.; John Stachura, superintendent, Enoco Collieries Corp.; and V. S. Meister, Jeffrey Mfg. Co.

charged off in one year because it is such a small part of the investment.

Mechanical mining to the average Ruhr miner means a chain conveyor and steel props, Mr. Templeton added. Compressed air is used extensively in all mines and coal is broken from the face with air hammers. The coal plow will replace air hammers on some longwall faces in the future.

Factors pointed out by Mr. Templeton as contributing to the high mining cost and low production per man shift, are:

1. All coal is recovered, regardless of cost.
2. All mined areas must be backfilled —an expensive operation carried out by blowing material into the mined area with compressed air.
3. Adverse mining conditions—in many instances worse than in U. S. anthracite mining.
4. High temperatures in deep mines, making labor difficult and performance poor.

Officers elected for the coming year at the morning business session were:

President—Birch Brooks, manager of operations, Walter Bledsoe & Co., Terre Haute, Ind.

First vice president—G. Fred Bieler, Terre Haute, Ind.

Second vice president—Joseph Anstead, Linton-Summit Coal Co., Sullivan, Ind.

Third vice president—Harry Cruikshank, superintendent, Dresser mine, Walter Bledsoe & Co., Terre Haute, Ind.

(Continued on p 144)

PUBLIC RELATIONS IN ACTION . . .

MACHINERY DEMONSTRATION, part of the ceremonies at the opening of the Mary Gail No. 4 mine in Leslie County, Kentucky, was witnessed by some 300 people in the community which will benefit from employment at the mine.

OPERATING MEN included: Ken Tate (left), preparation engineer, Hazard; Grant Smith, assistant general manager, Smith Coal Co.; Clyde Franks, general superintendent, and M. H. Smith, general manager and partner, Mary Gail.

Community Views Opening of Kentucky Mine

OVER 300 LOCAL PEOPLE, including a group of high-school students, gathered Nov. 3 to witness the official opening of the Mary Gail No. 4 mine of the Mary Gail Coal Co., in the western part of Leslie County, Kentucky. Prayers were offered by the Rev. Elmer Sizemore and other speakers included M. H. Smith, general manager and partner in the company; Elmer Begley, Leslie County judge; and John D. Begley, county superintendent of schools. As a part of the ceremonies at the drift portal, the group saw coal undercut, drilled, broken down with Cardox and loaded by a Joy 14-BU into shuttle cars.

Plans call for producing 2,500 tpd and development will include a double-tracked haulageway of heavy rail 2 mi long to the rear of the property. Coal will be transported by truck over 2 mi of new highway constructed by the company through difficult terrain and then 16 mi to a washing and dry-cleaning plant for loading on the L&N at Manchester, Clay County. The mine is in the Hazard No. 4 seam, with a seam height of 56 in. It is the first opening in the area of huge reserves of coal lands owned by the Ford Motor Co. and was of particular interest to the community.

Mr. Smith, operating as the Smith Coal Co., at Wooten, and hauling by truck to Coombs, Perry County, was the first man to open a mine in Leslie County for shipment by railroad. Properties he manages, in addition to the Mary Gail No. 4, now produce 60,000 tons a month.

Personal Notes

Robert K. Beacham, general manager, Ayrshire Collieries Corp., Indianapolis, Ind., has been named vice president in charge of operations. With the company and its predecessors since 1929, first as a groundman around a stripping shovel, he has served as mine foreman, superintendent, general superintendent and general manager. Under his direction are the three Ayrshire mines in Indiana and the three mines of Delta and Fairview Collieries in Illinois, which produced 3,822,000 tons in 1952. In his new post, Mr. Beacham will devote considerable time to planning the development and operation of new mines shipping 1,800,000 tons a year under Ayrshire's OVEC contract.

Bell & Zoller Coal & Mining Co., Chicago, has promoted **C. Ward Padgett** from general superintendent of the company's Oriole and Moss Hill mines to general superintendent of the Zeigler and Buckhorn No. 2 properties. Prior to his association with Bell & Zoller in 1948, Mr. Padgett was with Crescent Coal Co., Central City, Ky. **J. W. McGregor**, chief electrician at the West Kentucky mines, succeeds Mr. Padgett there.

At a board of directors meeting held in New York, Dec. 22, **Robert H. Hughes** was elected president and a director of the Clinchfield Coal Corp., Dante, Va., and **C. Kyle Tieche** was elected vice president. A graduate of Clemson College with a degree in mechanical and electrical engineering, Mr. Hughes joined Clinchfield Fuel Co. in 1935 as fuel engineer, serving in that capacity until in 1940 when he was appointed assistant chief engineer of Clinchfield Coal Corp. in Dante. In 1947 he became chief engineer and in 1951 was elected vice president in charge of operations. Mr. Tieche was graduated from the University of Kentucky and came to Clinchfield in 1947 as production engineer. In 1948 he was appointed superintendent of Moss mine, later that year was made general superintendent of Moss and Meade mines, and in 1952, was appointed general superintendent of the company's Virginia operations.

Inland Steel Co., Wheelwright, Ky., has announced the appointments of **J. T. Parker** to general superintendent, and **E. M. Pace** to mine superintendent of the Wheelwright and Price mines. Mr. Parker formerly was superintendent of coal properties, and Mr. Pace was mining engineer.

Old Ben Coal Corp., Chicago, has announced numerous changes in its operating management, effective Jan. 1. **Howard Lewis**, general superintendent since 1948, was elected vice president in charge of operations, succeeding **Roy L. Adams**, who will continue to serve the company in an advisory capacity. **William C. Campbell** will assist Mr. Lewis. **J. W. MacDonald**, chief engineer since 1936, was advanced to vice president in charge of engineering. **George Strunck**,

(Continued on p 158)

W. M. Ritter Heads Red Jacket

WILLIAM M. RITTER, vice president and general manager, Red Jacket Coal Corp., Red Jacket, W. Va., was named president last month, succeeding Paul D. Ritter, of Columbus, Ohio, who has retired. While at Princeton University, Mr. Ritter majored in geology and later took graduate work at West Virginia University before joining Red Jacket in the preparation department. He had held the positions of division superintendent, assistant general manager and general superintendent, successively, until his appointment to vice president and general manager in April, 1951.

EG&FA Makes Five Changes

A. P. Boxley (above), manager, High Volatile Div., Coal Div., Eastern Gas & Fuel Associates, Beckley, W. Va., was promoted Feb. 1 to production manager for all mines, with offices in Pittsburgh. **W. D. Hawley**, general superintendent, Low Volatile Div., replaces Mr. Boxley, but remaining at Glen White, W. Va. At the same time, it was announced, the position of general superintendent has been eliminated from the EG&A organization. **E. H. Shaw**, general superintendent, McDowell County mines, and **J. S. Wells**, general superintendent, Boone and Wyoming County mines in West Virginia, and Weeksbury mine in Kentucky, have been named production engineers for the division managers; Mr. Shaw with H. A. Quenon, manager, Low Volatile Div., and Mr. Wells with Mr. Hawley. **W. W. Hunter**, general superintendent, Fayette County mines, was assigned to special duties under Mr. Boxley.

Small Coal-to-Chemicals Plant Will Show Profit, Says USBM

A 30-TPH COAL-HYDROGENATION PLANT producing mostly chemicals can be made to pay out in 5½ yr and will return 10.8% on equity capital, according to two engineers of the U. S. Bureau of Mines Synthetic Fuels Demonstration Plant, Louisiana, Mo. The engineers are L. C. Skinner and S. Katell. Their report was read in December at the St. Louis meeting of the American Association for the Advancement of Science.

The design of the theoretical plant is similar to that of the big synthetic-fuels demonstration plant but much smaller. Plant investment likewise is estimated to be much less. Investment would be kept low by holding plant size to a single-stall installation, using natural gas to make feed hydrogen, buying electric power instead of building a power plant, and incorporating plant-design improvements developed in the Louisiana plant.

Messrs. Skinner and Katel explain that their study shows the flexibility of coal hydrogenation. The plant they envision could be converted quickly from chemicals to liquid-fuel production. It would differ from Carbide & Carbon Chemical Co.'s chemicals-from-coal plant, now operating in West Virginia, by requiring more hydrogen and higher pressures and by producing lower-boiling chemicals and some quantities of liquid fuels.

The 30-tph plant could be built for $34,148,000. Necessary operating capital would bring total capital required to $38,181,000. Figuring on coal at $3.75 per ton delivered, natural gas at 30c per 1,000 cu ft and electric power at 6.3 mills per kilowatt-hour, with total operating costs of $8,612,480 per year, the plant would yield chemicals with a market value of $13,583,000 per year. Profit after taxes and interest for the average year during the 25-yr period of bonded indebtedness would be $2,058,050, or 10.78% on the original equity capital.

Annual production of the projected plant would be 29,000,000 lb. of phenol, cresols and xylenols; 15,500,000 gal of benzene, toluene and xylenes; 22,100,000 gal of gasoline; and 7,920,000 gal of liquefied petroleum gas. The plant would require 471 employees.

COOL O-B Fused Taps give BEST Protection

Cut-away view of Form-H Tap

Here are some reasons why O-B Fused Taps keep cool!

1. Wide contact jaws clamp wire or cable tightly. Current is transferred over a wide area. Several types of contacts available.
2. Tap terminals maintain a tight grip on fuse. Contact surfaces do not oxidize.
3. Three fastening methods assure firm, tight connections for all trailing cable sizes.

O-B Fused Taps give trailing cables the best protection because they *keep cool!* Overheating, of course, reduces a fuse amperage rating, causes blowouts, and tempts machine operators to overfuse. Thus cool taps are important, for they permit steady fuse protection while carrying specified currents.

Save the production that's lost when fuses blow because of overheating. Keep machines working, with adequate fuse protection, with O-B Fused Taps on your trailing cables. From a choice of six wire contacts, and three terminals for trailing cables, you'll get fused taps that are tailored to your face machinery!

Ohio Brass

MANSFIELD OHIO, U. S. A.

4946-M

New Mine Developments

Jewell Ridge Coal Corp. Takes Over Hutchinson Coal

The Jewell Ridge Coal Corp., Tazewell, Va., announced Jan. 6 the purchase of the Hutchinson Coal Co., Fairmont, W. Va., which operates three mines in the Logan field. The company's general sales and operating offices will be moved immediately from Fairmont to Tazewell, but there will be no interruption in the operation of the mines and the Hutchinson name will be continued. New officers of the Hutchinson Coal Co. are Huston St. Clair, president; C. E. Walker, executive vice president; and R. R. Bunton, secretary-treasurer. William H. Cooke, vice president and general manager of the Ridgewood Coal Co., another Jewell Ridge subsidiary operating in Logan County, has been named operating manager of the Logan mines.

Kaiser Steel Corp. Expands

Kaiser Steel Corp., Sunnyside, Utah, reported last month the opening of its new Sunnyside No. 3 mine. The operation is planned for a capacity of 1,500 tpd. By the end of 1953 the company expects to expand its present annual capacity of 1,100,000 tons to some 1,600,000 tons.

Valley Camp Opens Mine

The Valley Camp Coal Co., Elm Grove, W. Va., has reported the opening in mid-December of its new Valley Camp No. 8 mine in Kanawha County, West Virginia. The property is planned for a capacity of 3,000 tpd, shipping via the New York Central. The 300-tph cleaning plant is equipped with a Jeffrey jig.

Guyan Eagle Expands Capacity With Two New W. Va. Mines

The Guyan Eagle Coal Co., Amherstdale, W. Va., reported last month that its new Guyan No. 5 mine, under development for some time, would begin production April 1. The new property, which is a deep operation at Kelly, Logan County, W. Va., will have a daily capacity of 4,000 to 5,000 tons. It will be served by a new 650-tph cleaning plant, shipping via the C&O. Plans for the development of the new Elk Creek No. 3 deep mine by the Elk Creek Coal Co., a Guyan Eagle subsidiary, also were announced. Planned for a capacity of 1,500 tpd, the mine is at Emmett, Logan County, W. Va., and also will ship via the C&O. Date of its opening was not disclosed.

Six Anthracite Companies Join To Seek Oil and Gas Resources

Six anthracite mining companies have banded together to form a new corporation that is seeking leases on 8,000 acres in Northumberland County, Pennsylvania, for oil and gas exploration, it was announced Jan. 2 in Sunbury, Pa., by Daniel M. Coxe, of the Coxe Estates. Sponsors of the newly organized Amgas Corp. are the Philadelphia & Reading Coal & Iron Co., Lehigh Valley Coal Co., Glen Alden Coal Co., Jeddo-Highland Coal Co., Lehigh Navigation Coal Co. and Gilberton-Lawrence Fuels, Inc. Research had indicated the presence of oil and gas in certain townships in the area, Mr. Coxe reported. None of the mining companies own lands in the district. In Harrisburg, S. H. Cathcart, chief

(Continued on p 152)

Among the Manufacturers

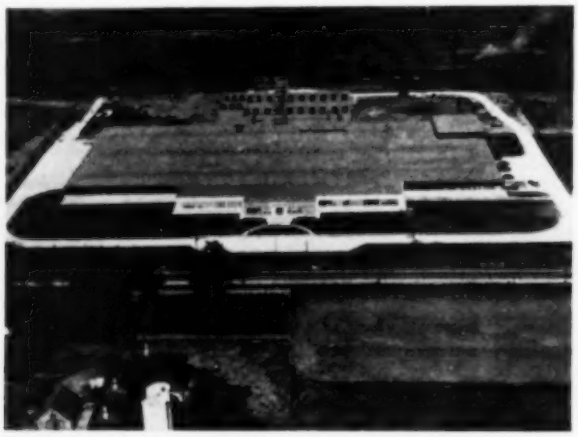
Mine Safety Appliances Co., Pittsburgh, has established two new mining district offices. At Uniontown, Pa., H. R. Johnson, district manager, with offices at 303 Second National Bank Bldg., will supervise sales engineers stationed at Pittsburgh, Pa.; St. Clairsville, Ohio; and Clarksburg and Fairmont, W. Va., and service engineers at Pittsburgh and Washington, Pa.; and Buckhannon and Fairmont, W. Va. V. A. Stanton, district manager is in charge of the new Johnstown, Pa., district office at 610 Johnstown Bank & Trust Company Bldg. Reporting to this office are sales engineers at Ebensburg, Pottsville, Trucksville and Indiana, Pa.; and service engineers at Ebensburg, Punxsutawney, Pittston and Shenandoah.

Hubbard & Co., Pittsburgh, has elected Joseph V. Smith chairman of the board

(Continued on p 182)

Farmers Engineering Moves Plant

THIS NEW PLANT, reportedly valued at over $1 million, has been completed and opened by the Farmers Engineering & Mfg. Co. on a 7-acre site at Irwin, Pa. Moving of the firm from Pittsburgh follows the current industry trend to locate outside of congested city areas, Norman F. Agnew and W. Porter Place, partners in the firm, point out. The modern structure provides ample space and efficient facilities for manufacturing, assembly and shipping on the ground floor, while the second floor is devoted to engineering, general offices and associated departments.



Illinois Plant the 21st for Gould-National

BETTER SERVICE for industrial battery users in the Middle West is expected with this new $3 million factory erected at Kankakee, Ill., by the Industrial Div., Gould-National Batteries, Inc. The facility is the company's 21st plant in the U. S. and Canada and adds nearly 5 acres of floor space to its productive capacity. Located on a 30-acre site, the new steel and concrete plant combines factory and offices in a 522x302-ft structure designed for efficient straight-line manufacture, with a one-story 196x180-ft forming building adjacent.

Smooth Collection Assured

with O-B Trolley Materials

Collectors hug wire held with O-B Smooth Underrun Fittings

Where smooth current collection is essential, use O-B Smooth Underrun Fittings. That's what was done in this high-speed haulage system to insure dependable track switch operation! O-B Type-T Section Insulators and O-B Bulldog Trolley Wire Clamps flank electrical controls in the overhead which govern track switch settings. These controls are operated by the locomotive current collectors as they pass. Since shoes zip past the O-B Fittings without a bit of bouncing, they ride smoothly as they pass the control, and proper track switch operation is certain.

Just as important are the other O-B Smooth Underrun Fittings used throughout this heavy-duty haulage system to assure long wire life and long collector life. They prevent bumping and arcing; thus there is no burning to steal life from wires or collectors.

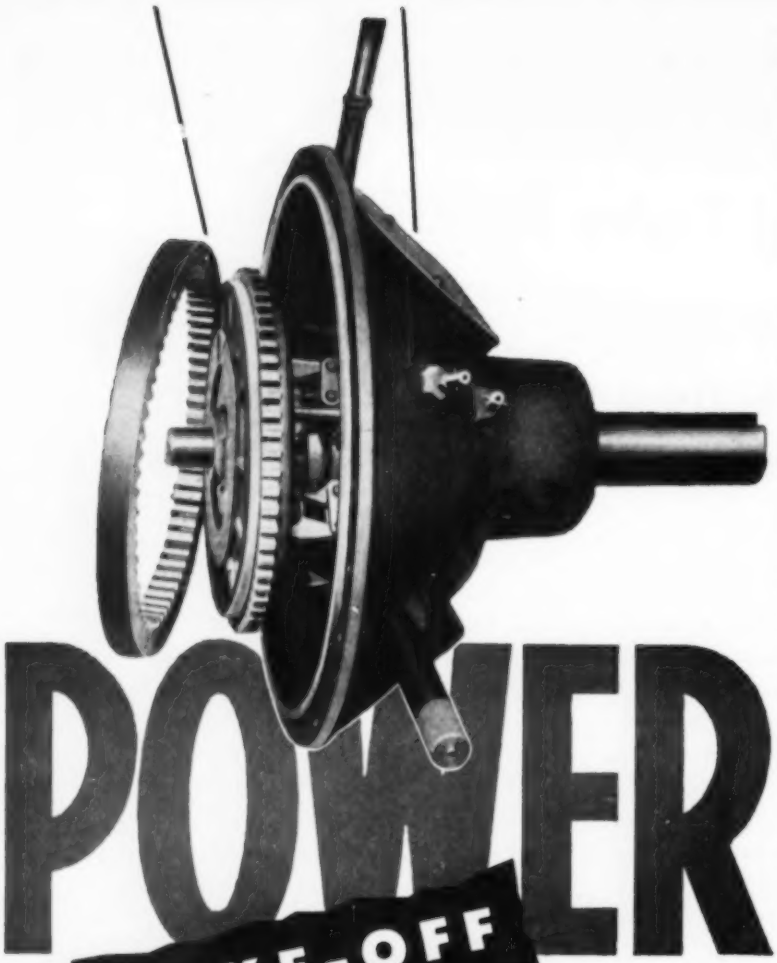
For wire-hugging, burn-free current collector action, safeguard your haulage system with O-B Smooth Underrun Fittings!

With high speed, heavy haulage on this main track, dependable operation of automatic track switches is essential. O-B Smooth Underrun Fittings make sure the current collector passes the control without bouncing!

Ohio Brass

MANSFIELD OHIO, U. S. A.

4339-M



POWER

TAKE-OFF

There's more to a Twin Disc Power Take-Off than meets the eye. They last, and last, and last . . . because—driving and driven plates provide *positive* clamping action; slipping capacities are in *excess* of rated capacities; tolerances are *more exact*, to assure quicker, easier engaging and disengaging. And when they *do* wear out, they're backed by the fastest, most thorough service program in the field—with 60 Parts Stations, 8 Factory Branches—fully staffed and stocked. If power take-offs enter your industrial power picture, consult Twin Disc Factory Branch your nearest Twin Disc Factory Branch where stocks are maintained for emergency requirements.

Twin Disc Power Take-Offs are available with clutches ranging from 6.5" to 24" single-plate, from 11.5" to 24" double-plate. Housing sizes No. 6 S.A.E. to No. 00 S.A.E. Capacities up to 650hp. Write for complete specifications, Bulletin No. 129-C.

Built for a Long Life . . .
Backed for a Lifetime

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin · HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND · DALLAS · DETROIT · LOS ANGELES · NEWARK · NEW ORLEANS · SEATTLE · TULSA

INDIANA MEET . . .From p 139

Secretary—Harvey Cartwright, commissioner, Indiana Coal Operators' Association, Terre Haute, Ind.

Executive board members for the coming year are: V. S. Meister, Jeffrey Mfg. Co., Terre Haute, Ind.; Alva Harris, superintendent, Ingle Coal Corp., Elberfeld, Ind.; John Stachura, superintendent, Enoco Collieries, Inc., Vincennes, Ind.; Placide Mayeur, superintendent, Princeton Mining Co., Princeton, Ind.; L. S. Ahlen, district manager, Goodman Mfg. Co., Terre Haute, Ind.; Colvin B. Burk, superintendent, Viking mine, Viking Coal Corp.; A. G. Gossard, general superintendent, Snow Hill Coal Corp., Terre Haute, Ind.

Elected to life membership in the institute were: Wesley Harris, Bicknell, Ind.; Jack Ogilvie, Bicknell, Ind.; P. L. Donie, Vincennes, Ind.; Peb Conrad, Emison, Ind.; Charles Herbert, Vincennes, Ind.; and Harry A. Keenan, Sullivan, Ind.

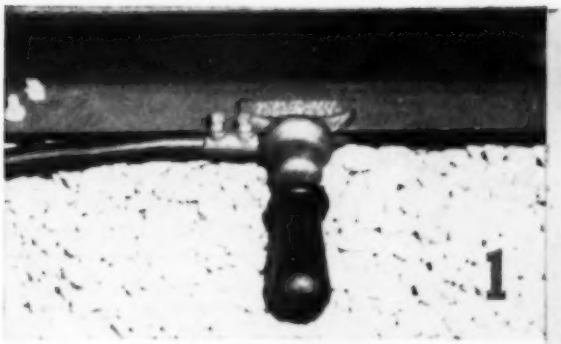
CONTINUOUS MINING

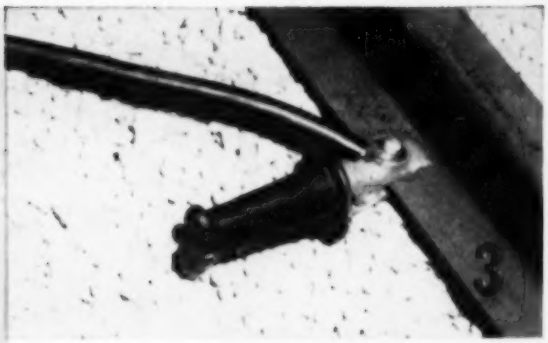
Describing the Colmol as a giant mole on treads, Herman L. Thomas, mining sales division, Jeffrey Mfg. Co., Columbus, Ohio, used slides and a moving picture to illustrate the principles of continuous mining and the results produced with the Colmol. All operations of the Colmol are performed hydraulically by a group of five hydraulic motors, each of which has a specific job. One operates the top row of arms and one the lower group of arms; one powers each crawler tread, and one drives the conveyor chain.

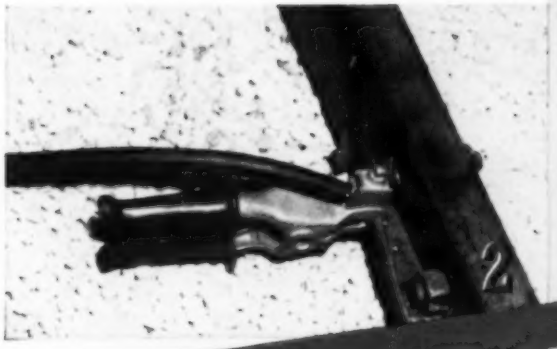
Best results in development work, Mr. Thomas pointed out, are obtained with a three-heading system with breakthroughs driven on 45 deg. Suggested width for working places is 12 ft. This permits the machine to drive an approximately 9-ft-wide place along one rib, leaving about 2½ ft of coal on the other rib to be mined in a slab cut after the machine is returned to the starting point. Where top conditions permit, entries have been driven wider than 12 ft with good results.

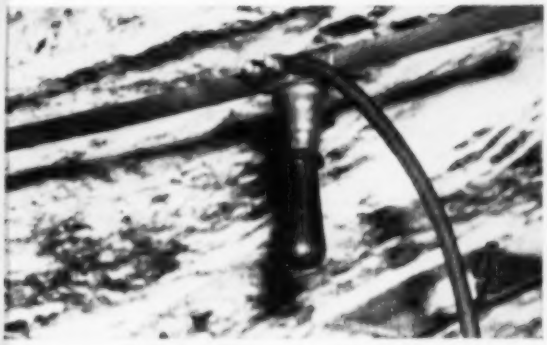
The stumbling block in continuous mining, Mr. Miller emphasized, is getting the coal away from the miner. To solve this problem, Jeffrey developed the Molveyor, which is a series of self-propelled, rubber-tire-mounted belt conveyors connected in series and attached to the continuous miner. The other end discharges directly onto a belt conveyor. Best operating length for the 15-ft units has been found to be a 300- to 350-ft-long group. Belts run at 300 fpm and can carry coal from the miner at the rate of 3 tpm. Molveyors have signals at both ends and may be operated from either end. An adjustable discharge is another feature of the Molveyor, Mr. Miller pointed out.

As evidence of the possibilities of continuous mining in coal production, Mr. Miller reported that a western Pennsylvania operator has produced over 700 tons per shift with continuous mining methods, averaging approximately 75

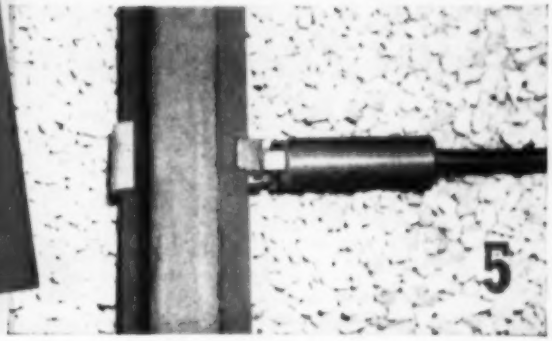








O-B Ground Clamps are SHAKE-PROOF and PULL-PROOF!



Shake-proof, pull-proof O-B Ground Clamps let you forget about power interruptions and poor connection troubles. They really stay put on bonds, rail bases, or on feeder cables, so they keep return circuits and safety grounds connected.

O-B Ground Clamps are safe, too! Cable terminals are well away from the users' hand and wrist. Heavy rubber handles give protection from shock if the clamp should be attached while the power is on.

One or two of these clamp styles should meet the grounding needs for your portable equipment. Let them banish makeshift, loose connections for your return circuits and safety grounds!

1. **Bulldog Rail Clamp**
   For machine cables as large as No. 2
2. **Standard Plier-Type Ground Clamp**
   For machine cable as large as 4/0.
3. **Junior Plier-Type Ground Clamp**
   For machine cable as large as No. 4.
4. **Bulldog Cable Taps**
   Available in three sizes, to grip feeder cables from 4/0 to 1,000,000 cir. mils. For machine cables as large as No. 1.
5. **Mine Rail Clamp**
   For machine cables as large as No. 2.

Ohio Brass
MANSFIELD OHIO, U. S. A.

...it's a TRANSITE PIPE mine drainage line!

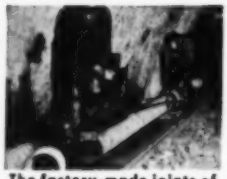
Carrying acid mine waters day in and day out is no problem for corrosion-resistant Transite Mine Service Pipe.

In many installations—some of them under corrosive conditions so severe that ordinary pipe failed in months—this asbestos-cement pipe has been in service for as long as 15 years—and *with no replacements!*

In addition to its long-term economies this pipe has many practical advantages that make it ideal for mine service. Tough and strong, it won't deform in use. Yet it is light in weight and easily installed. It is quickly coupled together, even in restricted mine passages—can be laid around curves or obstructions without special fittings. Its tight joints stay tight in service.

Available for working pressures up to 150 lbs. per sq. in. and in a full range of sizes, Transite is the money-saving pipe for many mine service requirements, including drainage lines, water supply lines, etc. For further information, write for Brochure TR-51A. Address Johns-Manville, Box 60, New York 16, N. Y.

Transite is a Johns-Manville registered trade mark



The factory-made joints of Transite Mine Service Pipe are assembled with a simple coupling puller.

Curves present no problem with Transite Mine Service Pipe. Deflections up to 5° can be made at each joint.

Tough, strong asbestos fibres help give Transite Mine Service Pipe many of its outstanding qualities.

Johns-Manville
TRANSITE mine service PIPE

COMING MEETINGS

AIME: annual meeting, Feb. 16-19, Hotel Statler, Los Angeles.

Eleventh Annual Anthracite Conference: May 7-8, Lehigh University, Bethlehem, Pa.

American Mining Congress: Coal Convention and Exposition, May 11-14, Cleveland, Ohio.

tons per man shift. Other operations have produced over 40 tons per man shift.

MINER IMPROVEMENTS

L. C. Ahlen, district manager, Goodman Mfg. Co., Terre Haute, Ind., presented James E. Robbins' paper on "The Possibilities of the So-Called Continuous Miner in Coal Production." Mr. Robbins, who was unable to attend the meeting, is consulting engineer, Mechanical Miner Co., Chicago.

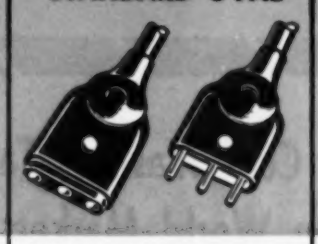
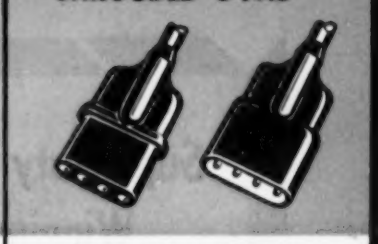
Continuous mining machines have now passed the experimental and testing stage, declared Mr. Robbins. In numerous installations they have progressed to the point where they represent the most economic mining method. Looking to the future, Mr. Robbins forecast that average production per man shift will double in the next 4 to 5 yr. Two factors which will influence the increase are: (1) the coal market will decrease until high-cost producers are eliminated, and (2) the continuous miner will be improved and its application will become more widespread.

Development of continuous mining machines may be divided into three stages, Mr. Robbins reported. During the first stage, now completed, the tonnage produced per unit of operating time was low, excess fines were produced and floor cleanup was poor. Early benefits noted were improvement in roof conditions and concentration of production in a small area.

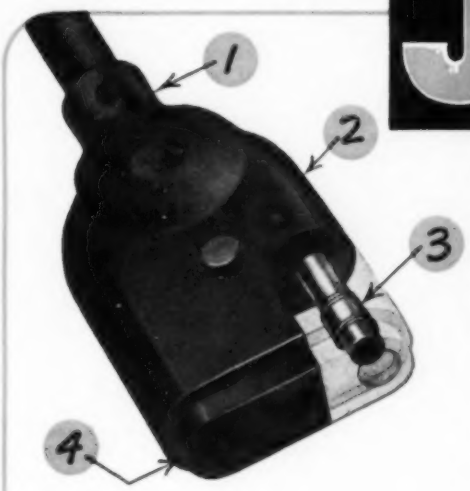
In the second stage, where we have been for the past year, Mr. Robbins continued, many of the early weaknesses have been corrected. Among other things, it was learned that continuous miners can not be used in all seams and under all conditions. This stage spotlighted the most serious problem remaining in continuous mining—the low percentage of miner operating time resulting from the difficulty of providing continuous haulage from the miner to the belt or mine cars.

Types of machines successfully developed in this stage were: (1) those using the "shredding" principle. Included are the Joy, first Goodman miner and the Lee-Norse machines; (2) those using the horizontal boring principle, such as the Jeffrey Colmol. Variations of this type are the high-wall coal augers and a modern version of the McKinlay entry driver, the latest of which is the Goodman-McKinlay type or the Mechanical Miner. The German coal planer and the British "Trepanning" machine also are considered as continuous mining machines, declared Mr. Robbins.

The third stage of operation will be

PUSH-LOCK	STANDARD ROUND	STANDARD OVAL	SHROUDED OVAL
			
JOY Price Sheet 5212-2.1	JOY Price Sheet 5212-2	JOY Price Sheet 5211-2 & 3	JOY Price Sheet 5211-4

JOY PUSH-PULL STYLE



1. One-piece, factory molded assembly strengthens cable connector junction
2. Tough, *molded-as-a-unit* Neoprene Jacket resists wear and increases safety
3. Expert Pin and Socket design (see below) insures low-contact resistance
4. Neoprene faces fit closely when engaged, insuring a water-sealed connection

ELECTRICAL CONNECTORS

Your confidence in JOY Electrical Plugs or Receptacles is always justified. Job-proven on thousands of installations under every conceivable working condition during the past quarter-century, they're unequalled for performance, safety and durability. One-piece-molded-to-cable design (details at left) makes them water-tight, shatter-proof and amazingly age resistant . . . and because they're made of Neoprene, oils, acids, alkalies or moisture have little effect on their life span or conducting efficiency.

Available in a wide variety of conductor numbers and sizes, they are ideal for connecting electrical power to all kinds of portable machinery or semi-stationary equipment subject to periodic relocation.

Remember—JOY job-proven Plugs and Receptacles actually cost less because they last longer. *Ask for full details with descriptive literature today.*

CHOICE OF 4 JOB-PROVEN STYLES

PUSH-LOCK . . . Slight twist during engagement locks connectors and prevents accidental disconnects. Available in 32 volt rating for welding needs. Also supplied in 600 and 5000 volt designs.

STANDARD ROUND . . . A favorite of many years standing. Single Conductor designs available for 600 or 5000 volts . . . multiple conductor designs rated at 600 volts.

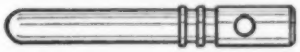
STANDARD OVAL . . . Best for general all-around use. Available in polarized three and four or non-polarized three conductor designs rated for operation at 600 volts or less.

SHROUDED OVAL . . . Extended skirt or shroud on male plug guards contact pins. Available in polarized three and four conductor designs rated for operation at 600 volts or less.

SPRING LOADED FEMALE SOCKETS

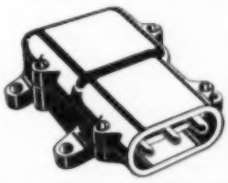
Provide a long life of snug low-resistant contact. Spring-loading causes I.D. of socket to match O.D. of its mating male pin during engagement. Unique design prevents bell-mouthing or over-expansion.

SOLID MALE CONTACT PINS



JOY Male Connector Pins have no split ends to collect dust or increase resistance. They are accurately machined as solid units from high quality rod, carefully selected for its low resistance and wearing qualities.

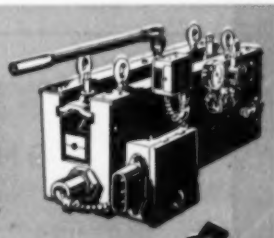
WIDE SELECTION OF MATING RECEPTACLES



There's a JOY Receptacle or Gang (multiple outlet box) for nearly every standard electrical need. All have one-piece *replaceable* Neoprene inserts manufactured to the same exacting specifications set up for JOY Portable Plugs (see description above and at left). Many are available in choice of terminal back or pig-tail lead designs. UNIT ILLUSTRATED is Joy's No. 352MM, curved base three conductor Machine Receptacle.

CABLE VULCANIZERS . . .

JOY Vulcanizers for repairing and re-jacketing cable splices, quickly pay for themselves. Two designs are available, "steam" and "direct heat". Both are electrically heated and have automatic temperature controls. Bulletin RV106 describes them in detail and lists mold vs. cable sizes. *Ask for your free copy, now!*



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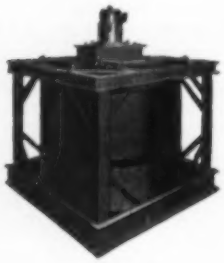
SuperDuty Coal Washing Tables Winning World Markets

An increasing number of inquiries and orders from other countries is testimony of the efficiency and reputation of the SuperDuty Diagonal Deck Coal Washing Table.

It takes only a glance for an engineer to appreciate the diagonal deck principle that has won such favor. It is a matter of adapting the shape of the washing area to the natural flow of the material bed. By presenting in this area more riffles of natural effectiveness, the elimination of high gravity waste materials is more efficient and less coal is lost in the refuse. SuperDuty Coal Washing Tables can be furnished for efficient application to practically all fine coal cleaning problems.



CONCENCO FEED DISTRIBUTOR

The Concenco Revolving Feed Distributor is a heavily fabricated all steel machine with motor drive requiring 1 H.P. or less in operation. It effectively provides a splitting of feed into any desired number of equal portions, feeding any number of circuits or machines in battery for greater overall efficiency. Unexcelled for feeding Coal Washing Tables.

THE DEISTER ★
CONCENTRATOR
COMPANY
903 Glasgow Ave. • Fort Wayne, Ind., U.S.A.
CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

one in which continous haulage is provided from the machine to the belt or mine cars, Mr. Robbins declared. The benefits of continuous mining in the future will cause the cost curve to drop rapidly. Better roof control, simpler ventilation and better supervision are cost-cutting factors possible with continuous mining, added Mr. Ahlen.

From results obtained to date in various operations it appears that continuous mining is past the crisis and progress will become increasingly rapid. The two remaining problems are haulage and adaptation of suitable mining plans.

Perhaps more energy and brain work is being expended on continuous haulage than on any other machine design problem at present, declared Mr. Robbins. Articulated conveyors and bridge conveyors are among the most promising available now.

In discussing 7 mo of experimental work with the Colmol, John Stachura, superintendent, Enco Collieries, Inc., Bruceville, Ind., pointed out that very little mechanical difficulty was experienced. At first some difficulty was encountered with the crawlers and there were some breakdowns. Installation of new-type crawlers corrected the difficulty.

To arrive at optimum design for the seam being mined, Mr. Stachura added, many changes in boring-arm design and bit type were made. As a result, bit cost was cut from 75c per ton to approximately 10c per ton at end of the experiment.

All types of bits were used on the boring head in an attempt to find the most efficient and economical type. A conventional cutting machine bit with a 3/16-in radius produced the best results, Mr. Stachura emphasized.

Production during the last 10 days of the experiment was approximately 275 tons per shift.

COAL PREPARATION

Over a period of years the trend in preparation is controlled by market demands and with our Indiana coals we must up-grade within practical limits and effect labor savings in every phase of production, including preparation, declared M. A. Matthews, president, Templeton-Matthews Corp., Terre Haute, Ind., in keynoting his paper on "Coal Preparation."

While jigs, upward-current washers, heavy-media washers, free-discharge launders, concentrating tables and air cleaners are all basic equipment in Indiana plants, the jig is most frequently used, Mr. Matthews pointed out. That is because it more nearly meets the preparation requirements for Indiana markets.

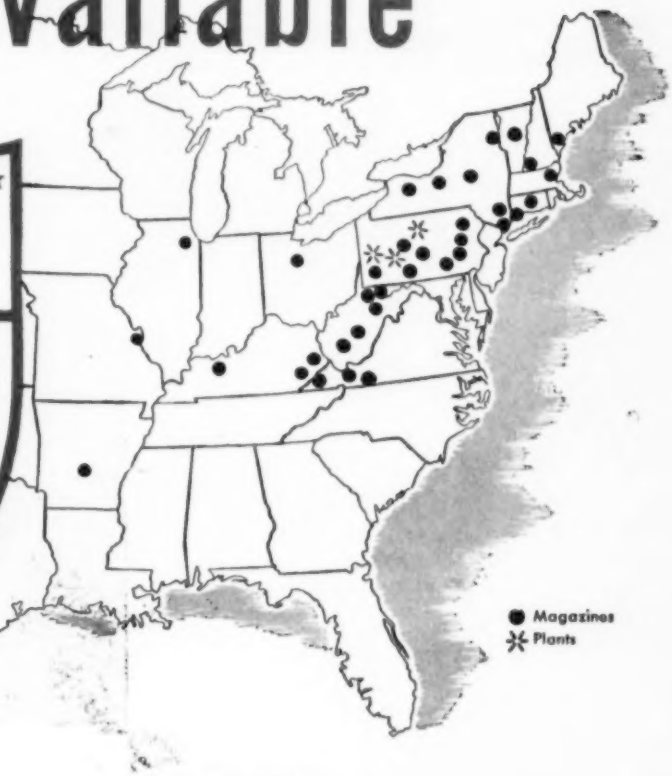
Mechanical cleaning is a necessary adjunct to mechanical mining and most Indiana mines have what may be referred to as maximum potential cleaning, within practical limits, with auxiliary equipment to obtain moisture reduction, Mr. Matthews added.

Examples of present-day cleaning methods cited by Mr. Matthews were jigs and concentrating tables, jigs with trough separators or upward-current washers, and a trough washer with air

readily available

AMERICAN
CYANAMID COMPANY

EXPLOSIVES



AMERICAN EXPLOSIVES

You can get quick deliveries of AMERICAN explosives and blasting supplies from our well located plants and distributing magazines. The AMERICAN line includes explosives exactly suited to your requirements—produced under intensive research, close chemical control, and unremitting care in manufacture. Always specify AMERICAN.

Capable Field Engineers
Are Available At Your Call

***High Explosives *Permissibles**

***Blasting Powder *Blasting Accessories**

AMERICAN *Cyanamid* COMPANY

EXPLOSIVES DEPARTMENT
30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

Sales Offices: Pittsburgh, Pa. • Bluefield, W. Va. • Scranton, Pa. • Chicago, Ill. • Pottsville, Pa. • Maynard, Mass.

Save on maintenance costs

Simplify lubricant storage and handling

Eliminate application errors at the face

with

Gulf Mining Machine Lubricant

Gulf Mining Machine Lubricant does the job of two or three other lubricants and does it better! Here's why:

1. Heavy body—reduces leakage from housings and gear cases.
2. Superior lubricating value—insures less wear.
3. Exceptional adhesiveness—prevents throwoff.
4. Effective resistance to the washing action of water.
5. Multi-purpose—equally suitable for bearings and gears.

For additional information on this quality product, call in a Gulf Sales Engineer. Write, wire, or phone today. Gulf Oil Corporation · Gulf Refining Company, Pittsburgh 30, Pennsylvania.

GULF INDUSTRIAL LUBRICATION

concentrators for fines. Pre-drying of the fine coal before air cleaning is practiced.

Dense-media plants in Indiana have generally been limited to plants where only coarse coal is cleaned, Mr. Matthews reported. The screening problem prevents complete utilization of heavy-media and dictates the use of auxiliary equipment for cleaning fines.

Mr. Matthews pointed out that coal, middlings and refuse are being pumped frequently and future plants will probably incorporate this method of material handling because of the low capital investment and lower operating and maintenance costs plus flexibility.

ELECTRICAL CONTROLS

In discussing "Electric Controls for Preparation Plants," R. S. Peterson, chief electrical engineer, Templeton-Matthews Corp., Terre Haute, Ind., reported that the rapid progress in coal preparation has made it necessary to develop new complex electrical control systems.

Tracing the history of controls, Mr. Peterson pointed out that controls have advanced from the hand-operated control through the magnetic push-button stage to sequence starting and finally to the separate control circuit operated by magnetic contactors.

Competition and a changing market brought on rapid expansion of coal-preparation facilities. This included crushing, rescreening, blending and washing facilities. Each new step added new motors to the preparation plant and made motor control more complex, Mr. Peterson reported. New developments in control equipment have made it possible to set up a relatively simple system.

In the modern preparation plant, the control circuit is separate from the motor circuit and is energized through a magnetic contactor operated by a push-button station at a central control panel, Mr. Peterson explained. Selective sequence is used to control the motors and all units are interlocked. Selector switches permit individual units to be operated out of sequence while making adjustments or repairs.

Automatic control with minimum plant personnel is the aim of the modern control system. Although notable advancement has been made in recent years, Mr. Peterson emphasized, all the possibilities have not been exhausted. The fully-automatic preparation plant may be nearer than realized.

SAFETY IN MINING

In describing "Roof Fall Accidents," Fred Conrad, chief inspector, Lynch Coal Operators' Reciprocal Association, Terre Haute, Ind., emphasized that roof falls are the No. 1 killer in coal mines. Falls account for 50% of the fatal accidents and 25 to 30% of the serious non-fatal accidents. Continuing, Mr. Conrad pointed out that foremen and workers often neglect to examine roof properly, with the result that many lives have been lost.

Roof-bolting is helpful in eliminating accidents resulting from roof falls. Proper installation is necessary for adequate protection.

Cooperation between foremen and

...ride a "JEEP"

The Lee-Norse TJ1 Mine Jeep gets you there safely! Here's the best answer for speedier underground transportation to and from working faces and emergency areas for mine superintendents, engineers, inspectors and maintenance personnel. A versatile performer the Lee-Norse Jeep can be used to pull man-trip cars, fire-fighting equipment and can be quickly placed in service as an ambulance. Detailed data available on request. Write now!

...ride a "SCOOTER"

No reason for mechanics, pumpers, fire bosses and other maintenance personnel to lose valuable time hitch-hiking when there is a Lee-Norse Scooter at hand. Weighing approximately 1000 lbs., the Scooter is popularly priced and its low-operating cost fits into every mine budget. The Scooter has a 48" wheelbase, is 9' in overall length and is available in all track gauges from 36" to 48". Where time is a factor the Lee-Norse Scooter is a "must". Send today for complete information and prices.

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The Crux of Dependable Roof Support

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PATTIN

ROOF BOLT

Expansion Shell

With the continuous advance of mechanical mining, roof bolting is rapidly gaining ground. Not only does this type of roof support afford greater safety by reducing roof falls, but also provides greater working areas at the face. The new Pattin Expansion Shell offers the advantage of *double* expansion plus a 3-inch parallel contact with the hole . . . No definite drilling depth is required as the shell can be anchored any place in the hole . . . The PATTIN shell anchors solidly and will not turn while being tightened . . . wedge and shell being locked together prevents loss of parts in handling . . . No special nuts or ears are required on the bolts.

Patent applied for

THE PATTIN SPLIT TYPE BOLT

This is one of the first slotted bolts and is still a favorite wherever split type bolts are used. The bolt is a full 1-inch in diameter with cut threads and is furnished with hex or square nuts and various size plates and wedges.

ALL MINING COMPANIES now bolting, experimenting or planning to roof bolt can depend on PATTIN shells and bolts for better anchorage and reduced bolting cycle time . . . Our engineers are available for consultation and demonstrations . . . We will be pleased to work with you on any present or future roof bolting program. For additional information or demonstration, get in touch with our Marietta office.

PATTIN MANUFACTURING CO.
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The Pioneer in Roof Bolting

workmen, safety classes and accident-prevention courses are all necessary if accidents are to be reduced. Safety can be improved only through the continuous effort of all, Mr. Conrad declared.

Glen Alden Advertises for Men

Glen Alden Coal Co. has been using large-scale advertising in regional newspapers to recruit workers for its mines in the Wyoming Valley area. The company plans to hire some 2,000 men over a prolonged period as the necessary working places are made available. The promotion is another step in Glen Alden's plans to increase its working force to make its mines more efficient. As another inducement, a home-to-mine bus is being added, starting in Olyphant and traveling to mines in the Nanticoke region. Buses are being run direct to the mines from Scranton, Avoca and Duryea.

MINE NEWS . . . From p 142

geologist in the Pennsylvania Department of Internal Affairs, said that the search for oil and gas in the anthracite region is a "100% wildcat venture." Experts employed by the Coxe Estates completed a surface survey of the area last fall and "made recommendations as to where wells should be drilled to determine if oil and natural gas are present," he said.

R&P Sells Mine Property

The Rochester & Pittsburgh Coal Co., Indiana, Pa., has disposed of its property in Cambria County, Pennsylvania, to the Kovalchick Salvage Co., for a reported $30,000. Included in the arrangement are R&P's Renglo mine, closed since last November, approximately 1,144 acres of land, leases and coal rights, etc., with the coal company reserving the right to remove some of its larger equipment and facilities if it acts during 1953. It was understood that it would move that equipment to other mines during the year. The Renglo mine had been operated by R&P since 1946 and produced 194,401 tons last year. While the property reportedly is still not exhausted, no estimate of the recoverable coal remaining is available. The salvage company's future plans for the property have not been announced.

Wage Increase Closes W. Va. Mine

The Kistler No. 62 mine of the Utilities Coal Co., at Kistler, Logan County, W. Va., discontinued operation Dec. 31 because of the $1.90 daily wage increase in the new UMWA contract according to a statement attributed to Frank Enslow, company president. The mine, which was opened in 1914, produced 224,600 tons in 1951 and currently was employing about 175 men.

Y&O to Sell Houses as Florence Mine Works Out

The Youghiogheny & Ohio Coal Co., Martins Ferry, Ohio, announced last month that it expected to work out its Florence (Ohio) mine in about a year and that it planned to offer the 60

CUT DRILLING COSTS !!!

BLAST HOLE AND COAL RECOVERY DRILLS

● McCarthy Self-Propelled Horizontal Blast Hole Drills get in and out of tight quarters quickly; adjusts on four individual leveling jacks for proper drilling heights. Excellent for low level work.

● Truck Mounted Horizontal McCarthy Drills are breaking drilling records everywhere! All necessary equipment is carried with the unit — out of the mud at working level!

● Here's a Vertical McCarthy Unit on a Half-Track. Compact construction makes McCarthy Drills perfect for all mountings . . . truck, half-track, cat, jumbo or other special rigs.

HYDRAULIC FEED

Instant-action control selects any speed up to 6 feet per minute

FINGER-TIP CONTROL

Determines rotat-

Heavy

Rugged

Powerful

● Compact mobile-mount unit for vertical blast hole drilling. Retractable tower hydraulically operated. Setups are easy, drilling action positive, cuts drilling cost per ton.

● McCarthy Coal Recovery Drills are revolutionizing both deep and strip mine operations. As the auger moves in, steady streams of clean coal are pulled out without touching the overburden. Average daily output ranges from 15 to 50 tons per man per shift. Many models are available. The machine illustrated above is equipped with a 36-inch auger, retriever, hoist and Lump Drill Head.

McCARTHY DRILLS

● If you haven't already seen a McCarthy at work, we suggest you see one quick!

These rugged, powerful units have gained universal acceptance as the most efficient machines ever made for drilling blast holes. Furnished with gasoline, electric or diesel power.

Extra heavy construction relieves you of maintenance troubles. They're versatile, fast, economical machines capable of 50% more productive service than any drill you might now be using!

Write Salem Tool today for full facts. Also ask about McCarthy Coal Recovery Drills — the machine that's being acclaimed in so many trade journals for its remarkable ability to reduce mining costs.

DRILLING EQUIPMENT SINCE 1901

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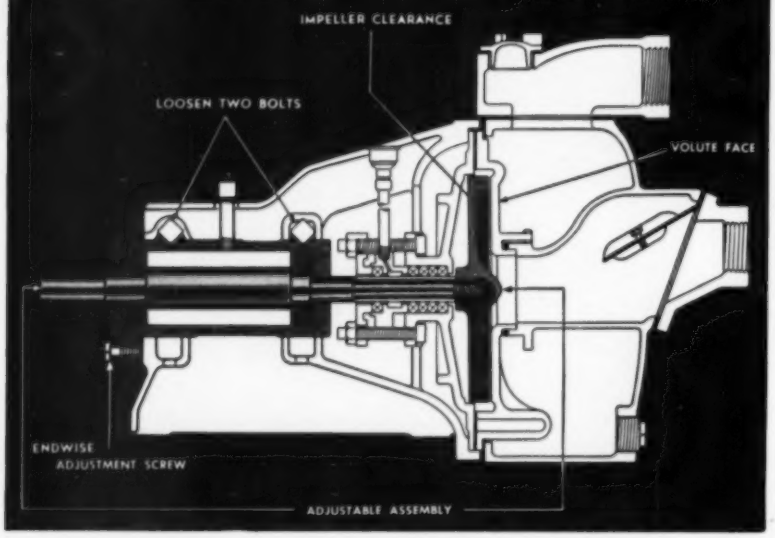
HERE IS THIS MINE PUMP'S *FOUNTAIN of YOUTH*



RENEWS THE PUMP TO BRAND NEW PERFORMANCE IN ONLY A FEW MOMENTS!

Gorman-Rupp pumps are noted for their **high pumping efficiency** and their **long trouble-free service.**

In any pump, however, under the gruelling requirements of mine service and acidity of mine water, certain parts are subject to wear.

The point most affected by these conditions is the clearance between the impeller face and the volute face. Due to wear this clearance increases, resulting in loss of head and capacity.

THE ANSWER IS SIMPLE WITH A GORMAN-RUPP

Loosen two bolts and move the entire Adjustable Assembly forward (see illustration) by means of the endwise adjustment screw. This reduces the impeller clearance to normal and — **THE PUMP PERFORMS LIKE NEW.**

Gorman-Rupp pumps save money in mine operations and require very little headroom. ***Ask for Bulletin O-ME-11***

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homes in the community of Florence for sale shortly to miners now living in them. According to reports, the mine produced 404,596 tons in 1951, employing an average of 298 men. Sealing of the entries of the company's old Barton mine also was reported last month. Y&O discontinued its operation of the 50-yr-old property in 1951, but cleaning up of the coal had been carried on last year by an independent firm.

Columbia-Southern Acquires Hitchman W. Va. Mine

Sale of the Hitchman mine at Benwood, Marshall County, W. Va., to the columbia-Southern Chemical Corp., a subsidiary of the Pittsburgh Plate Glass Co., was announced Jan. 13 by H. B. Salkeld, president of the Hitchman Coal & Coke Co. and the Tasa Coal Co. Included in the arrangement was some 1,700 acres of coal land. According to reports, the new owners are expected to increase the working force to about 160 men from the current average of 120 men, with a corresponding boost in output. The mine will be known as the Columbia mine, and the property will be under the supervision of P. C. Beutel, manager of the Columbia coal division at Midvale, Ohio. While coal will continue to be available to local domestic and commercial markets, the mine will also serve the Columbia-Southern plant at Natrium. The mine, which was opened about 40 yr ago by the Hitchman family, was acquired several years ago by the Tasa Coal Co.

Preparation Facilities

United States Steel Co., Robena slope mine, Green County, Pa.—Shipment by Deister Concentrator Co., of 16 Super-Duty Diagonal-Deck No. 7 coal washing tables, making a total of 24 shipped to date.

Pennsylvania Water & Power Co., Safe Harbor, Pa.—Shipment by Deister Concentrator Co., of two SuperDuty Diagonal-Deck No. 7 coal washing tables.

Mathies Coal Co., Mathies mine, Courtney, Pa.—Shipment by Deister Concentrator Co., of four Model 108-B Concenco revolving feed distributors.

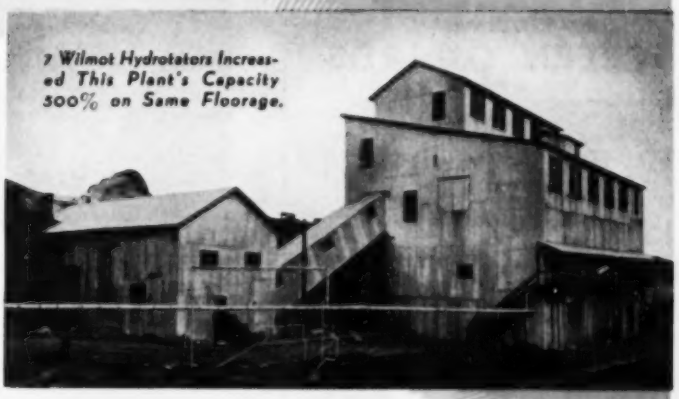
Reidinger Coal Co., Paxinos, Pa.—Contract closed with Menzies Separator Co., for one 2-ft Menzies cone to clean rice and barley; feed capacity, 7 tph.

Diminick Coal Co., Paxinos, Pa.—Contract closed with Menzies Separator Co., for one 2-ft Menzies cone to clean buckwheat; feed capacity, 7 tph.

D & Z Coal Co., Shamokin, Pa.—Contract closed with Menzies Separator Co., for one 2-ft Menzies cone to clean pea coal, 7 tph feed capacity.

State of Tennessee, Petros, Tenn.—Contract closed with Haworth Engineering & Mfg. Co. for 200-tph coal preparation plant, including shaking screen, picking tables and vibrating screen, to prepare hand-picked lump and egg, stoker and carbon.

See Wilmot Automatic HYDROTATOR COAL CLEANERS in Low-Cost Operation

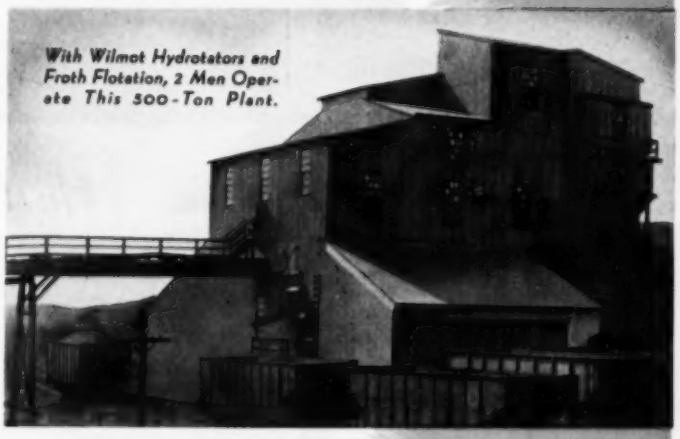


7 Wilmot Hydrotators Increased This Plant's Capacity 500% on Same Floorage.

A Near Approach to Push-Button Preparation. Units for All Anthracite & Bituminous Sizes.

You are invited to visit operations and see for yourself how Wilmot Hydrotator equipment is helping coal operators to increase carry-over to profits. If this is not convenient let us send you plant records showing how the advanced engineering of Wilmot Hydrotators, Hydrotator-Classifiers, and Froth-Flotation units is: (1) cutting labor costs sharply through the automatic features; (2) increasing feed capacity without plant changes; (3) improving market acceptance by stabilizing product quality at new high standards; and (4) increasing percentage of yield.

Wilmot Hydrotators, Hydrotator-Classifiers, and Froth-Flotation units are furnished for all sizes of anthracite and bituminous coal plants, and all coal sizes. We invite you to use our engineering and laboratory services in a study of how to adapt your plant to the Wilmot Hydrotator System of automatic coal cleaning.



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Wilmot Units Put Entire Product of This 1100-Ton Fines Plant in Premium Price Class.

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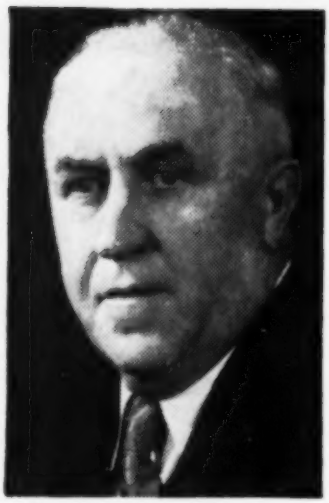

New Pennsylvania Secretary

William J. Clements, Deputy Mines Secretary, was appointed Pennsylvania Secretary of Mines Dec. 31, by Gov. John S. Fine, to succeed Richard Maize. With the mines department for over 25 yr as a state mine inspector, Mr. Clements was appointed last year to the newly created post of field deputy secretary of mines for the anthracite region. Mr. Clements announced that W. Garfield Thomas will remain deputy secretary of the bituminous division. At the time of his re-appointment in January, 1952, it was indicated that Mr. Maize, who is 77 this month and had held the post since 1940, was not expected to remain throughout the entire administration. In announcing his resignation, Mr. Maize stated that he would become a consulting engineer, with offices in Uniontown. Gov. Fine Jan. 8 selected Gordon E. Smith, a mine inspector since 1945, to become deputy secretary for anthracite.

Schull Heads Illinois Bureau

Ben Schull, vice president and general manager in charge of operations of the former Binkley Coal Mining Co., Terre Haute, Ind., before his retirement in 1947, was named director of the Illinois Department of Mines and Minerals by Governor-elect William G. Stratton Jan. 9. A native of Illinois, Mr. Schull was in charge of Binkley's mines in Illinois, Indiana, Missouri and Arkansas for more than 20 yr, as general superintendent, general manager and vice president, successively. Active in the coal industry for nearly 50 yr, Mr. Schull served on the executive board of the Indiana Coal Mine Operators' Association and was a member of the operators' negotiating committee in Indiana. After leaving Binkley, Mr. Schull bought and operated the Schull-Mooke Coal Co. for 3 yr, until again retiring in 1950.

Purcell New Indiana Mine Head

Charles A. Purcell, associated with the Viking Coal Corp. for the past 4 yr, has been named director of the Indiana Bureau of Mines and Mining, by Gov. George Craig, succeeding William Butts. Active in the Indiana coal industry for 25 yr, Mr. Purcell at one time was foreman for the Jackson Hill Coal Co., and also was a state deputy fire inspector. John J. Jones has been appointed superintendent of the Mine Rescue Station, succeeding Mr. J. McCullough. Six new deputy mine inspectors named were: William Sharps, Roy Hudson, Reid Lucas, James Redmond, Bert Cottrell and Frank Williams.

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replace obsolete car moving methods with barney type units to

INCREASE TONNAGE
DECREASE COSTS

STAMLER *Hydraulic* Car-Spotters have proven the best replacement because they

MOVE and INSTALL FASTEST
REQUIRE NEGLIGIBLE MAINTENANCE
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The W. R. STAMLER CO.
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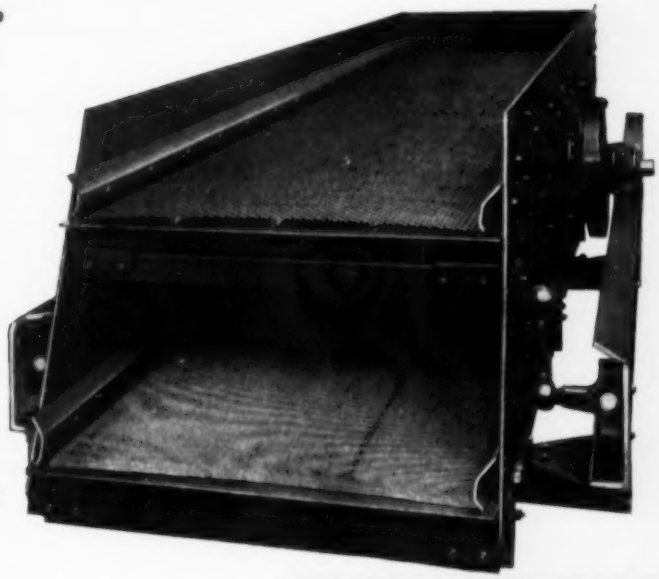
Talk About PURRformance



SMOOTH RUNNING SECO SCREENS PURR ALONG YEAR AFTER YEAR

We recently made a survey among a number of coal operators whose Seco vibrating screens have been on the job at least five years. The results of this polling of on-the-job performance on all types of screening assignments point out one important Seco advantage that should interest every profit-minded operator. This is smooth performance . . . and it's no accident. It's the direct result of Seco engineering. Only Seco with the patented equalizer assembly has fully controlled true circular action. That's why Seco vibrating screens run smoothly year after year . . . and smooth running screens last longer, with less maintenance. There's no bobbing, weaving or excess strain on moving parts. Yes, after all it's performance that counts. And if you want the benefits of smooth, trouble-free screening on your job, it will pay you to investigate Seco now! Write, wire or phone.

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TRUE CIRCULAR ACTION

VIBRATING SCREENS

THERE'S A SMOOTH-RUNNING SECO FOR EVERY COAL SCREENING JOB FROM SCALPING TO FINAL SIZING

Let Seco screening experts recommend the right screen or screens for your job. Over 350 models in single, double, triple and three and one half deck construction.

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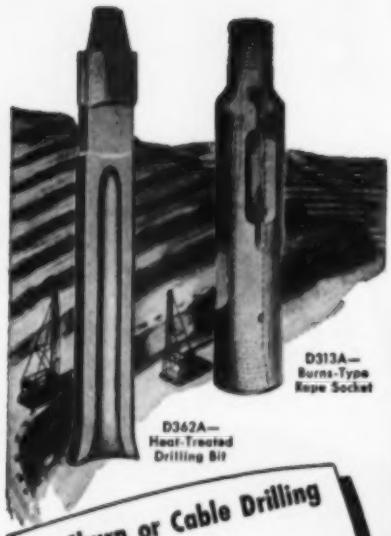

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SAFE • EFFICIENT • ECONOMICAL

Spang Churn or Cable Tools are top performers in their fields for drilling test holes when prospecting or sampling . . . drilling blast holes for fragmentation of minerals or overburden . . . drilling and reaming escape, dewatering and ventilating holes . . . and drilling wells for other purposes. Fifty years' experience serving oil, water-well, mining and quarrying operations assures their value.

LARGE BITS for pilot hole drilling and stage enlargement reaming of dewatering, ventilation and escape holes.

PERSONALS . . From p 140

chief electrical engineer since 1945, was promoted to superintendent of plants. **William H. Bailey** was appointed superintendent of Mines Nos. 11, 14 and 22; and **Joseph Littlefair**, superintendent of Mines Nos. 9 and 15. **Ed R. Lutz**, aboveground superintendent of plants, and **John E. Jones**, safety engineer since 1917, have been relieved of their daily duties but will remain with the company on a consultant basis.

Mr. Lewis, joining Old Ben in 1921 as motor boss, subsequently became assistant mine manager and mine manager at various mines until 1935, when he became assistant underground superintendent, and underground superintendent of all mines a year later. Mr. MacDonald

OPERATING KINKS FROM ABROAD

Double Trolley Wire Reduces Electrical Hazards

A NEW GERMAN twin-core trolley-wire system incorporating new safety features and reported to be the first of its kind used in mines has been developed by Brown & Cie., A. G., Manheim, Germany. The first installation is in the Ewald Fortsetzun 1/3 colliery, Rekinghausen-Erkenschwick.

Two trolley wires are installed overhead and locomotives are equipped with two poles and collector shoes which are kept in contact with the wires when the locomotives are in service.

Danger from electrical shock is reduced as contact with one conductor will not result in shock. The system also permits use of a collector-shoe gear similar to that used on a trolley bus, instead of the former sliding bows. An automatic insulation control de-energizes the circuit in event of a short circuit. The second wire reconnects the circuit without stray currents.

Research is under way to use the twin-core system as part of an automatic alarm to signal presence of methane.

Air Conditioning Ups Output at Belgian Mine

TO DECREASE absenteeism, improve health and increase production, air conditioning has been installed in the Rieu-du-Coeur colliery, Quaregnon, Belgium. Exhaustion of upper beds required development of deep beds and in 1947 development was carried on 4,500 ft below the surface.

Rock temperatures of 125 F in coal seams 25 in thick produced working temperatures too high for Belgian miners. As a result, Moroccan and Italian workers, accustomed to higher temperatures, were employed at the faces. Production was low, absenteeism was high and workers had poor health records.

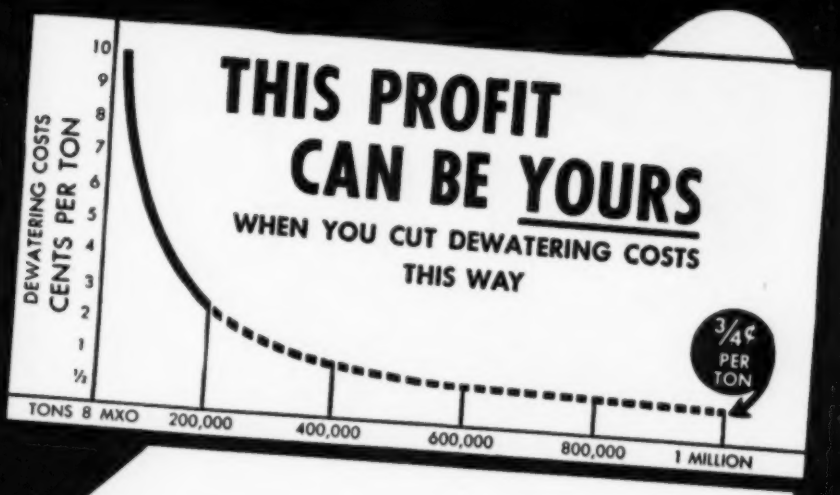
A two-stage plan for air conditioning was proposed by Jean van Weyengergh, managing-director of the mine. The first stage was carried out in 1952 with the aid of Marshall Plan funds. A surface-installed refrigeration plant supplies 129,000 cfm of cold air to the main intake. Air temperature has been cut in half and output per man-shift has increased appreciably.

The second step, contingent upon receiving Marshall Plan funds, will consist of a second stage of refrigeration at the shaft bottom. Cold water from the surface refrigeration plant will pass through a water-water heat exchanger at the shaft bottom.

From this exchanger, the water will pass through heat-insulated pipes in a series of water-air exchangers set up within about 150 ft of the working faces. Air will be refiltered and blown through the exchangers. Air temperatures of 60 F at the working faces is the goal of the second-stage cooling.

Cost of refrigeration, including amortization of refrigeration plant and piping is estimated at 50 to 60c per ton. Higher output per man-shift and less absenteeism are expected to offset the extra cost.

MORE PROFIT FROM YOUR FINE COAL WITH THE PETERSON TFR* FILTER



Peterson TFR* Filters in operation indicate ¾¢ per ton total maintenance cost (including screen amortization). Lubrication cost is nil – only two trunnion bearings to grease. The Peterson TFR Filter can be readily adapted to handle various size consists at power requirements depending only on the most economical moisture reduction.

A preliminary investigation of the economics of this rugged, low-cost filter for your particular conditions will be made without cost or obligation. Contact us today.

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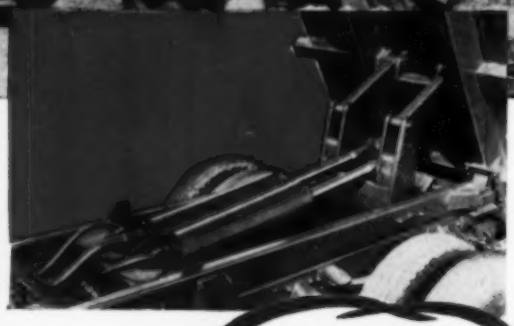

- √ Built to withstand the punishment of handling heavy loads of rock when loaded with big buckets.
- √ Rock bodies fabricated of ¼ (or heavier) steel plate for maximum strength.
- √ Rigid reinforcing provided with box-member ribs. Scoop ends standard.
- √ Floor has 2" hardwood cushion, sandwiched between truck bottom and ¼" wearing plate, to absorb loading shock.
- √ Reinforced steel subframe welded integrally with the body to support the load uniformly and distribute the lifting forces of the hoist without bulging or distortion.
- √ Subframe construction with both cross members and long members interlocked and welded into a single assembly to prevent sagging of body floor.
- √ Individually engineered to your requirements for body length and load distribution.

Strong Arm HOISTS

- √ Arm assembly made of structural steel welded to extra heavy reinforced tubing.
- √ Simplified design eliminates unnecessary troublesome parts. The simple toggle principle of the linkage requires extremely low oil pressure.
- √ Hoist frame designed to take all stresses imposed by action of the hoist without transferring any stress to truck frame.
- √ Endurance-tested hoist cylinder is precision-engineered to raise and hold loads efficiently and dependably.
- √ Fast-acting hoist mechanism elevates body to over 50° dumping angle within 12 seconds after raising cycle is started.

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BH-4

joined Old Ben in 1920 as assistant in the engineering department, becoming chief engineer in 1936. Mr. Strunck, employed at Mine No. 11 when Old Ben acquired the property, became electrical engineer of the Christopher mines in 1927. Mr. Adams joined Old Ben in 1917 as chief engineer, holding that post until 1936 when he was promoted to general superintendent, with headquarters in West Frankfort. He was elected vice president in charge of operations in 1948. Mr. Lutz joined the company in 1914, becoming electrical engineer for the West Frankfort mines in 1920, and in 1945, succeeding A. W. Spaht as superintendent of plants at all Old Ben mines.

C. Millard Dodson, president of Weston Dodson & Co., Inc., Silver Brook Coal Co., and Locust Coal Co., Bethlehem, Pa., since 1946, was elected Dec. 22 to the board of managers of Lehigh Coal & Navigation Co., Inc., Lansford, Pa.

Ed Skinner, assistant general superintendent, Ford Collieries Co., Wyandotte, Mich., resigned Jan. 1, to accept a position with International Minerals & Chemical Corp., Carlsbad, N. M., where he will be mining potash instead of coal.

Joseph J. Crane, general manager, Locust Coal Co., Shenandoah, Pa., since 1946, has been named manager of Weston Dodson & Co., Inc., at Lansford, Pa. Under arrangement with the Lehigh Navigation Coal Co., announced previously, Weston Dodson began marketing coal produced at Nos. 2, 5 and 6 mines, Nesquehoning mine and the various stripping operations in Lansford district, Jan. 1. Associated with Weston Dodson since 1914, Mr. Crane will move his headquarters to Lansford. No changes are contemplated in the supervisory personnel and other employees.

Obituaries

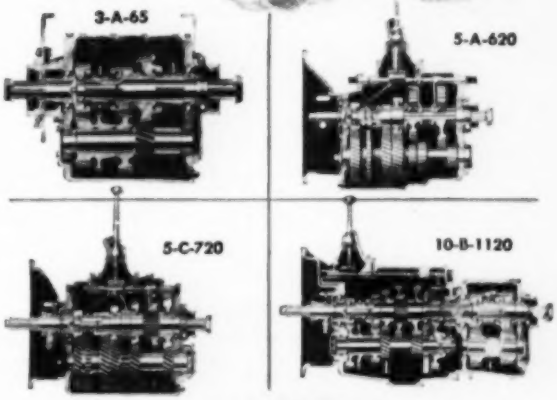
William J. Jenkins, 79, president, Consolidated Coal Co. until his retirement in 1950, died Jan. 11 of a heart attack, at his home in St. Louis. Widely known throughout the industry, he was past

Where hp *really* goes to work!

Fuller offers the most complete line of heavy duty transmissions available — more than 100 models—for every heavy duty application using internal combustion engines.

There's a Fuller unit or auxiliary transmission for any application—from two tons to the biggest —to provide exactly the *right gear ratios* for your job—to help your driver keep the engine turning at its most effective speed . . . to assure faster trips —higher average speeds.

That's why you see the Fuller name plate on the gear boxes of more and more trucks and industrial machines. Demand transmissions from the *Fuller* line to get maximum performance from *your* rigs.



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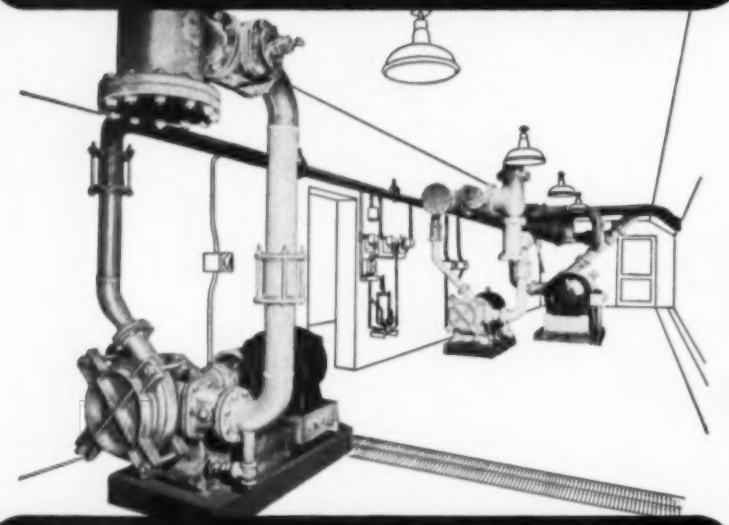
FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

Handles extremely thick slurries with high specific gravities



MORRIS Type R SLURRY PUMP

Heavy viscous slurries with solids ratios as high as 70% by weight are not unusual loads for a Morris Type R Slurry Pump.

A case in point is this Morris installation. The two Morris 3R Pumps in the foreground each handle 200 GPM of a cement slurry at 64% solids with 1.66 specific gravity. Speed is 1180 RPM. The 6R Pump in the background handles 600 GPM of the same slurry at 880 RPM.

Long operating life... little or no maintenance

Massive running parts of the Type R compensate for the increased load imposed by high specific gravities. Hydraulic passages are deliberately designed for high concentrations of solids—the result of careful study of wear patterns shown by pumps in the field handling all kinds of abrasive materials. Elimination of areas of throttling and turbulence assures uniform wear of all parts.

There are no internal studs or bolts—no troublesome internal joints and fits. The suction disc liner is merely *clamped* into position between disc and shell. The absence of high stress on the shell permits wide variations in its composition—including materials of high abrasive resistance—to resist wear and extend the operating life of the pump.

Let our engineers consult with you on your slurry pump problems. They'll give you the benefit of 88 years of pump-building experience. Or, write for Bulletin 181.

MORRIS MACHINE WORKS
Baldwinsville, New York
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

president of the Illinois Coal Operators' Association, and the Illinois Mining Institute, and for many years served as director of National Coal Association from Illinois.

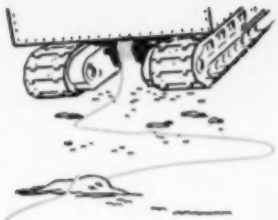
Isaac Lewis, 54, president, Quality Excelsior Coal Co., Greenwood, Ark., died Jan. 5 in an Elk City, Okla., hospital from injuries resulting from an automobile accident, Nov. 16, while he and his wife were en route to California on a business trip. Mr. Lewis had been a resident of Greenwood for 16 yr.

Fred J. Bailey (right), 60, safety director, Cardox Corp., Chicago, died Jan. 16 of a heart attack, at a meeting in Benton, Ill. Active in the coal industry for many years, Mr. Bailey had been associated with the Koppers Coal Div., Eastern Gas & Fuel Associates, and later with the Bureau of Mines as coal mine inspector. Widely known for his safety-promotion work, he was one of the leaders of the Bluefield Coal Show, for many years directing the Pioneer Miners' Club which he originated, and was past president of Post No. 1, Smoke Eaters, Welch, W. Va. Mr. Bailey is shown above crowing "King Safety" at the 1952 Bluefield Show.

H. A. Glover, 67, president of the Island Creek Coal Sales Co. prior to his retirement in June, 1951, died Dec. 18 of a heart attack at his home in Albuquerque, N. M. A pioneer in the market promotion program of the National Coal Association and for 3 yr chairman of the NCA marketing committee, Mr. Glover also had been a director of Pond Creek Pocahontas Co., Island Creek Coal Co. and Appalachian Coals, Inc., He was at one time sales manager of the Consolidation Coal Co. and the first president of the Coal Trade Association of Indiana, which he helped to organize.

Thomas L. Mullan, 46, manager of industrial relations, Frick Div., U. S. Steel Corp., died suddenly Dec. 23 at his home in Uniontown, Pa.

George Bobo, 42, owner of the George Bobo Coal Co., and other stripping oper-



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We—at Anaconda—are miners ourselves. We know shovel cable because we use lots of it. Safety and uninterrupted flow of power are important in any mining operation. In both respects we know Securityflex Type SH-D has a good record.*

for longer "failure-free" service on big shovels, insist on

Butyl-Insulated Securityflex above 2kv

This is Butyl-Insulated Securityflex Type SH-D. For your drills use patented rubber-cored Type G Securityflex Portable Cable.

ANACONDA Securityflex Cable is safer, less liable to "blow-out," easier to work with. Here's why:

BUTYL INSULATION. This accounts for improved resistance to moisture, ozone, heat (up to 80C).

NEOPRENE JACKET. Here is real flexibility and great strength engineered for this specific tough use. Handles well, has high impact resistance and lasts longer in all weather.

RUBBER-CORED GROUND WIRES. This safety-first feature prevents kinking, gives greater shield contact, and cushions the wires.

COPPER-COTTON SHIELD. Special new-type shield makes splicing easier, faster without damage to insulation. Eliminates chafing failures.

Ask your Anaconda Sales Office or Distributor to show you this and other ANACONDA portable mining cables. Learn how continuous improvements have made these famous cables better . . . for safety . . . and for increased production at less cost in your mine. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

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the right cable for the job ANACONDA® wire and cable

Insure Safety with SIMPLEX ROOF JACKS and PULLERS in Roof Bolt Installation

For Temporary Support During Installation . . .

Simplex Mine Roof Jacks—Safe, inexpensive, temporary roof support is provided by Simplex Roof Jacks during installation of suspension supports. They eliminate need for costly, time-consuming temporary timbering. Available in 8 and 16 ton capacities with several types of heads and a wide range of heights.

For Testing Load Factor After Roof Bolt Installation . . .

Simplex Re-Mo-Trol Hydraulic Center-Hole Pullers—Check the strength of roof bolt installations with the new Simplex Re-Mo-Trol Hydraulic Pumps and Rams. Re-Mo-Trol with a Center-Hole Ram is the easiest, safest method for testing the load-bearing ability of suspension supports. Tests are made merely by slipping the Re-Mo-Trol Ram over the bolt, which passes through the Center-Hole, and fastening the nut. Smooth, torque-free force is applied by operating the pump unit, and the stress can be read directly in tons from a gauge on the pump. The test is completed in minutes! Re-Mo-Trols are available in 7 models—10 to 100 ton capacities.

Where a self-contained testing unit is desired, the Simplex Center-Hole Jenny is ideal. Six models in capacities from 30 to 100 tons.

For full information, write for Bulletins: HYDRAULIC 51R and MINES 47

THE CENTER-HOLE MAKES IT EASY . . . only Simplex has the Center-Hole

SIMPLEX JACKS—*Standard for Safety —for ALL Mining Jobs*

Simplex LEVER · SCREW · HYDRAULIC Jacks

TEMPLETON, KENLY & CO.

1040 South Central Avenue, Chicago 44, Illinois

ations in Pennsylvania and Kentucky, was killed Dec. 23 when the engine of his private plane failed while flying from Williamsburg, Ky., to his home in Grove City, Pa. The accident occurred in Lockport, Ky.

Glen Tilley, 39, assistant mine foreman, Turkey Gap Coal Co., Dott, W. Va., died Dec. 31 at Bluefield Sanitarium following a heart attack. He had been associated with the company for 19 yr.

John Edwin Biggs, Jr., 51, chairman of H. E. Harman Coal Corp. and Feds Creek Coal Corp., and president of Norfolk & Chesapeake Coal Corp., Tazewell, Va., died Jan. 5 in a Palm Beach, Fla., hospital after a short illness. Shortly before his death, he was appointed by Gov. Battle of Virginia to the State Highway Commission.

Maj. W. W. Inglis, 82, retired president and chairman of the executive committee, Glen Alden Coal Co., Scranton, Pa., died Jan. 19 in Moses Taylor Hospital, Scranton. Beginning his career in the coal industry at the age of 14 as office boy for the Hillside Coal & Iron Co. and advancing to superintendent at 21, Maj. Inglis became general manager when the Pennsylvania Coal Co. and Hillside merged in 1909. In 1916, he joined Delaware, Lackawanna & Western R. R. Co. as general manager of its mining department, a year later becoming vice president. When Glen Alden Coal Co. was formed in 1921, he was made president, a position he held until 1946, when he retired, although he remained active in the company's affairs as a member of the board of directors and chairman of the executive committee. Active on the Anthracite Operators' Negotiating Committee since 1922, Maj. Inglis served as chairman from 1927, signing 12 contracts with the UMWA.

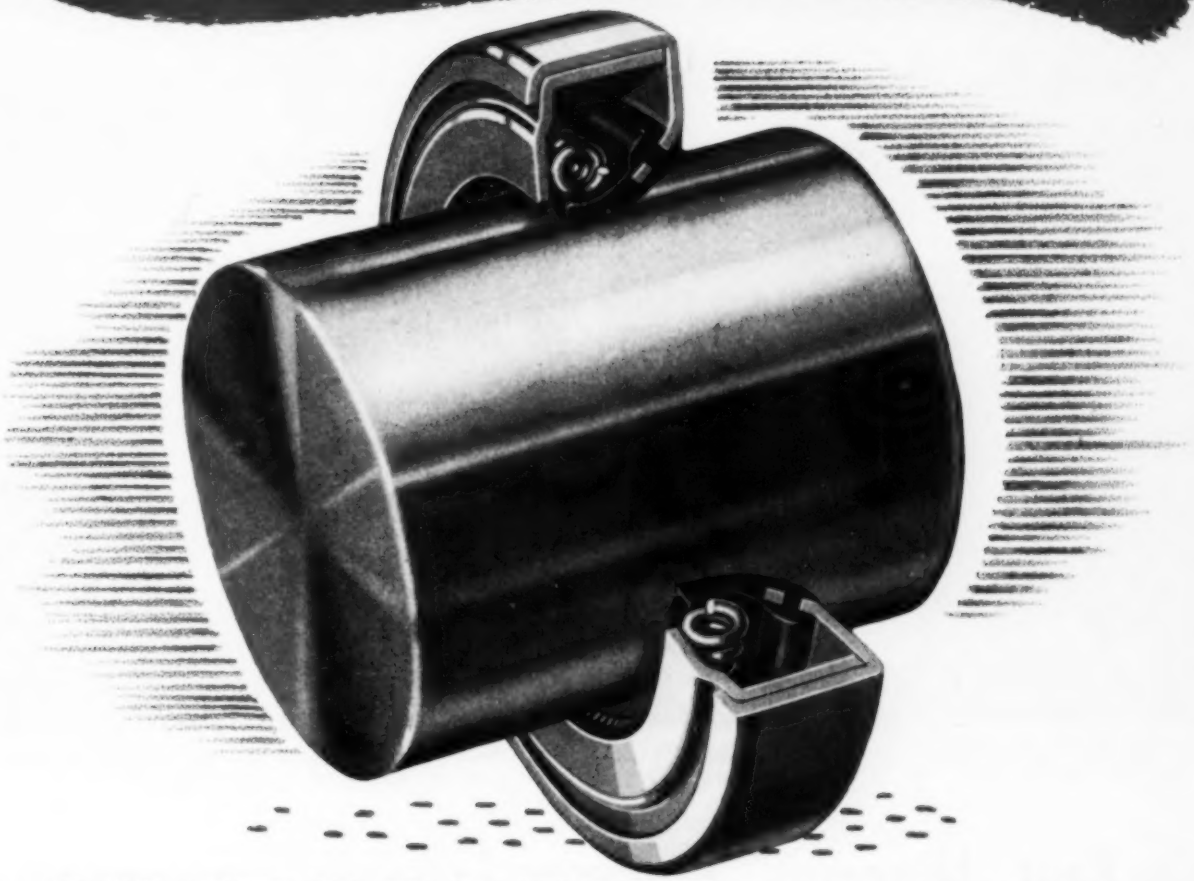
James R. Walthour, 57, Pennsylvania bituminous state mine inspector, 19th District, for many years, died Jan. 7 at his home in Circleville, Pa., of a heart attack.

Zack Justice, president, DJB Coal Co., died Jan. 12 at his home in Pikeville, Ky. He was a director of the Williamson Coal Operators' Association, and had been active in the association for many years.

Thomas B. Allan, 67, one of the owners of Victory Coal Mining Co., Mineral Point, Pa., since 1946, died recently of a heart attack in Johnstown, Pa. A veteran Cambria County coal operator, he was, for many years, a mine foreman for Peale, Peacock & Kerr, Inc., and general mine foreman at Nanty Glo and Clymer.

William J. Phillips, 46, federal mine inspector, Norton, Va., died Jan. 20 at his home in Norton after a 3 mo illness. Born and educated in Scranton, Pa., he was associated with Glen Alden Coal Co. for 18 yr, before becoming a federal mine inspector at Jellico, Tenn., 5 yr ago. He transferred to Norton 2 yr ago.

SEAL OUT DIRT . . . SEAL OIL IN!



VICTOPRENE (SYNTHETIC RUBBER) OIL SEALS

TYPE H This is the standard seal in the Victoprene line. It meets the requirements of the majority of applications, and is available for the greatest range of sizes. Its famous molded synthetic rubber sealing element is bonded to the metal shell. Constructed with a double outer wall for long life, and an accurate press fit is assured at seal periphery. A complete list of sizes of Type H is now available.

TYPE K This seal embodies the most advanced engineering in the field of metal encased, unit type fluid seals. It is outstanding for extreme temperatures and high shaft speeds. The sealing element assures maximum flexibility and reduction of frictional drag. The pressure sealing lip has proven to be as much as 60% better than that of old type seals.

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Before the shot . . . a general view of the Compass Coal Company stripping site at Elk City, W. Va.

After the shot . . . splendid fragmentation allows easy removal of sandstone and shale overburden.

Du Pont "Nitramon" Produces Excellent Fragmentation

ON STRIPPING OPERATION IN W. VA.

Holes loaded far in advance of shooting

In a typical recent shot at their stripping operation in Elk City, West Virginia, the Compass Coal Company loaded 35,000 pounds of Du Pont "Nitramon"* No. 2 in a total of 224 holes ranging in depth from 17 to 42 feet. The shot proved highly satisfactory . . . completely breaking up more than 60,000 cubic yards of sandstone and shale overburden.

Maximum safety is desirable on any job of blasting and at the Compass Coal operation the greater safety characteristics of "Nitramon" are particularly welcome. They permit loading holes immediately after drilling, and delaying shooting for as long a period as necessary.

Because "Nitramon" is packed in watertight, metal containers, inclement weather presents no obstacles. In addition, the containers are easily handled and help speed up loading. "Nitramon" is non-headache-producing . . . another appreciated feature.

Wherever you're planning a stripping operation blast . . . tough or routine . . . you can always rely on Du Pont "Nitramon"—the safest blasting agent known. "Nitramon" cannot be detonated by ordinary blasting caps, open flame, friction or sudden shock. And yet ...a "Nitramon" Primer (itself relatively insensitive) can be depended upon to detonate every charge as planned. You can obtain complete information about "Nitramon" and many other widely used Du Pont products for coal mining and stripping by asking the Du Pont representative in your own district. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

**Reg. trade-mark for nitrocarbonitrate blasting agent.*

DU PONT "NITRAMON"

A Product of Du Pont Explosives Research

DU PONT

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Association Activities

S. C. Higgins Retires From New River Coal Association

Stanley C. Higgins, secretary and labor commissioner of the New River Coal Operators' Association, Mt. Hope, W. Va., retired Jan. 1 after 32 yr with the organization. Hal M. Scott succeeds Mr. Higgins, in addition to his present duties as secretary and labor commissioner of the Winding Gulf Operators' Association, Beckley, W. Va. An assistant to Mr. Scott has been named by each association: Sibbley Weatherford for Winding Gulf, and Frank M. Ellison, Jr., for New River.

Holmes Safety Groups Elect Officials

The North Cambria (Pennsylvania) Council of Joseph A. Holmes Safety Association has re-elected the following officers: president, Richard Todhunter, Jr.; vice president, George P. Resick; and secretary-treasurer, Kenneth Richardson. The Windber (Pa.) Council has re-elected Michael W. Thomas president. Other officers are: first vice president, Stephen Andrejko, Jr.; second vice president,

EQUIPMENT APPROVALS

Ten approvals of permissible equipment were issued by the U. S. Bureau of Mines in December, as follows:

Jeffrey Mfg. Co.—Type MM-34F-52 mining machine; one 15-hp and one 75-hp motor, 500 v, DC; Approval 2-888A; Dec. 3.

Goodman Mfg. Co.—Type "54 Timberman" timbering machine; 10-hp motor, 250 v, DC; Approval 2-889; Dec. 4.

Acme Machinery Co.—Model 240-6-S air compressor; 50-hp motor, 230 v, DC; Approval 2-890; Dec. 4.

Jeffrey Mfg. Co.—Midget blower, blower drive unit; 5-hp motor, 380 and 500 v, AC; Approval 2-891A; Dec. 10.

Joy Mfg. Co.—Type 18HR2-2F loading machine; four motors, one 4 hp, two 7½ hp and one 75 hp, 500 v, DC; Approval 2-892A; Dec. 12.

Joy Mfg. Co.—Type U-179-86E/F chain conveyor drive unit; 15-hp motor, 250 and 500 v, DC; Approvals 2-893 and 2-893A; Dec. 12.

Joy Mfg. Co.—Type 8BU-16K loading machine; 15-hp motor, 440 v, AC; Approval 2-894A; Dec. 16.

Joy Mfg. Co.—Types 6SC5PE-2 and 6SC5PXE-2 cable-reel shuttle cars; three 7½-hp motors, 250 v, DC; Approval 2-895; Dec. 17.

Joy Mfg. Co.—Type PL11-7RPG/H elevating conveyor; 10-hp motor, 220 and 440 v, AC; Approvals 2-896 and 2-896A; Dec. 23.

Joy Mfg. Co.—Type TS2-2PE timber setter; three 4-hp motors, 250 v, DC; Approval 2-897; Dec. 24.

MODERN MINING *demands* PROTECTED CABLES

Mine operators everywhere are turning to modern improved methods to step-up their efficiency and production. And in all cases this means greater electrification: with portable power centers, junction and distribution facilities, continuous mining machines, high capacity loading and drilling equipment, etc.

Ruberoid Insulating Tape can insure more economical operation of this equipment by providing complete protection for electrical cables. Ruberoid Insulating Tape strengthens cables with a vise-like grip so that you can drag them anywhere with complete safety . . . through acid pools and over jagged surfaces. Check these seven cost-cutting features of Ruberoid Insulating Tape to assure longer life for your cables:

- Double grip . . . both sides adhesive
- Great tensile strength . . . tough
- Won't tear, ravel or pucker
- Resists abrasion
- Acid- and alkali-proof
- Extra thick . . . one layer insulates
- Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength.

* * *

For further information write The Ruberoid Co., 500 Fifth Avenue, New York 36, N. Y.

The RUBEROID Co.

ASPHALT AND ASBESTOS BUILDING MATERIALS

Store

Machine and Motor Repair Shop

Here's a Single Answer to Your Building Problems

These four structures illustrate only a few of the many applications of Armco Steel Buildings for coal mines. Many economy-minded operators have found them to be the safe, efficient answer to their building problems.

With Armco Steel Buildings, unique STEELOX construction provides both outside surface and structural support in a single unit. This simplifies construction. And the entire job can be handled by your own crew or any local contractor in a matter of hours. Labor costs are low.

Also important, these buildings remain weathertight year after year. They are noncombustible and lightning-proof when properly grounded. Armco Buildings have all the features of any permanent structure plus the added advantage that if desirable they can be dismantled and re-erected on a new site without loss of material.

With the wide range of sizes and types of Armco Buildings it is easy to find the right one for every coal mining application. Write for details. Armco Drainage & Metal Products, Inc., 1723 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

Armco Steel Buildings ARMCO

Surge Bin Building

Substation

James E. Rohr; third vice president, Raymond Lang; and secretary-treasurer, J. Alfred Whalley.

Anthracite Safety Group Picks 1953 Officers

Officers for the coming year elected at the December meeting of the Anthracite Safety Engineers' Association, held at Jeddo, Pa., were: president, R. Emmet Doherty, Anthracite Institute; vice president and program committee chairman, Patrick A. Loughney, Locust Coal Co.; and secretary-treasurer, Carl H. Riehl, Lehigh Valley Coal Co. The membership is made up of more than 90 safety, explosives and ventilation engineers and safety foremen in the anthracite industry.

Gunnison Valley Coal Group Elects Permanent Officers

At a meeting of the board of incorporators of Gunnison Valley Coal, Inc., Dec. 9, at Delta, Colo., the first set of permanent officials was elected, as follows: president, Lester A. Busey; vice president, Charles Fairlamb; and secretary-treasurer, Doyle Davidson. This nonprofit corporation was formed in October, 1951, by the Delta County Chamber of Commerce to develop the region's coal deposits, and to seek establishment of a coal-hydrogenation plant to produce liquid fuels and chemicals.

BCOA Group Changes Representation Policy

At a meeting Jan. 8 in Washington, the Bituminous Coal Operators' Association revised its policy of representation to include 11 members on the executive committee: five representing associations; two, captive steel interests; and four members elected at large. The committee will meet at least once a month, and the directors at least once every three months.

NCA Marketing Committee Names Sub-Committees

Three sub-committees have been formed to assist the Marketing Committee of National Coal Association: engineering, off-track markets and on-track markets. Named to the engineering subcommittee were: Chairman, R. E. Jamison Jr., vice president, Jamison Coal & Coke Co.; Richard Relf, president, North Western-Hanna Fuel Co.; A. R. Stock, vice president, Sinclair Coal Co.; and Harold D. Wright, chairman of the board, Republic Coal & Coke Co. The off-track markets group is composed of: Chairman, B. R. Gebhart, vice president, Chicago, Wilmington & Franklin Coal Co.; K. P. Burbidge, general sales manager, United States Fuel Co.; C. W. Clayton, vice president, Pittsburgh Consolidation Coal Co.; and S. S. Nicholls, vice president, C. H. Sprague & Son Co. The subcommittee on on-track markets includes: Chairman, H. P. Junod, Pickands, Mather & Co.; R. H. Bowden, vice president, West Kentucky Coal Co.; C. R. Mabley Jr., vice president, Island Creek Coal Sales Co.; and E. H. Zimmerman, chairman of finance committee, Imperial Coal Corp.

Why this special mine jack will give longer, trouble-free service

When Duff-Norton engineers set out to design safer, longer lasting jacks for men who work in and around coal mines, they discovered one startling fact—about 90% of jack maintenance was in replacing worn springs in the mechanism that controls the jack's raising or lowering action. Result? All Duff-Norton mining jacks are equipped with a patented*, adjustable spring mechanism which assures positive engagement of rack teeth. The spring's tension can be easily adjusted with a screw driver without removing any part of the jack. Should the spring eventually lose its resiliency, there's no need to send the jack to the repair shop. A new, complete spring mechanism assembly can be quickly installed by anyone in a matter of minutes, making the jack as good as new! In fact, as a special service, Duff-Norton distributors carry in stock extra spring mechanisms for all Duff-Norton ratchet lowering jacks.

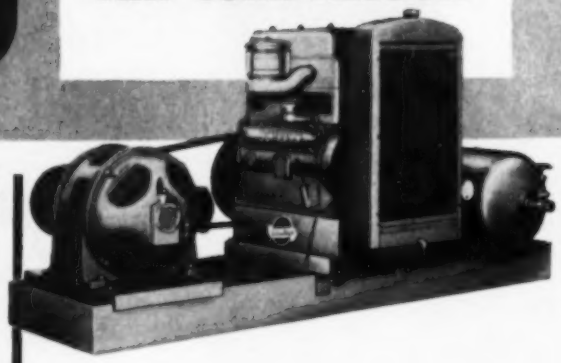
Ask your local distributor or write the world's oldest and largest manufacturers of lifting jacks for a copy of "*A Handy Guide for Selecting Duff-Norton Mine Jacks.*" This colorful, illustrated booklet is full of useful information about all kinds of jacks for coal men. Ask for bulletin AD10-J, The Duff-Norton Manufacturing Co., P.O. Box 1889, Pittsburgh 30, Pa.

The No. 516 MT for medium seam mines is 16 inches high when closed, can raise 5 tons up to 9½ inches.

DUFF-NORTON *Jacks*

"Giving Industry A Lift Since 1883"

8 reasons why you save $$$$ when you buy a SCHRAMM AIR COMPRESSOR



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COMPLETE PACKAGE Easy to install and capable of furnishing 24 hour continuous service.

COMPACT Occupies only a fraction of the space required by other makes and designs of compressors.

UNIT SYSTEM You can install several Schramm Compressors, as your needs require, in a minimum of space.

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ONE COST No expensive foundation necessary. Just install directly on any substantial floor.

VIBRATIONLESS Perfect balance of pistons and connection rods and vertical in-line construction, makes for vibrationless operation.

LOW MAINTENANCE Proper operating speeds . . . less horsepower required by compressor, cam operated mechanical intake valves provide greater volumetric efficiency.

LOW INITIAL COST Built in sizes ranging from ½ to 100 horsepower. Schramm ratings are given in actual air delivery at 100 p.s.i.g. and not piston displacement.

Write for a free copy of Schramm Catalog 51 10A for information on the complete line of Schramm industrial compressors and accessories.

SCHRAMM, INC.
The Compressor People
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USBM Names Weaver Chief, Coal-Mine Inspection Branch

Harry F. Weaver, former assistant chief and acting chief since August, 1952, has been named chief of the Coal-Mine Inspection Branch, Health & Safety Div., U. S. Bureau of Mines, Washington, D. C., succeeding M. J. Ankeny, who resigned in August to become safety director of the Bituminous Coal Operators' Association. A graduate of Pennsylvania State College in 1926, Mr. Weaver started with The Hudson Coal Co., Scranton, Pa., advancing from foreman to general manager's assistant and editorial chairman of the company's safety magazine. He joined the Bureau of Mines in 1942 as an inspector, stationed at Hazard, Ky., and later that year was promoted to mining engineer in Washington, D. C.

New Books for Coal Men

How Roof Bolts Save Money

Economies Through Roof Bolting in an Indiana Coal Mine, by L. W. Kelly. Here's how the substitution of roof bolting for peg timbering in the main entry saved an estimated $63,000 in the Kings Mine, Princeton Mining Co., Gibson County, Ind. Costs are detailed for each system, old and new. The study also tells how to support roof in caved entries and how to build a protective scaffolding that will provide safety in places where roof has caved to heights up to 25 ft. **USBM, I. C. 7653. 10 pp plus illustrations. 8x 10½-in; paper mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.**

Schooling for Young Miners

Science for Coal-Mining Students, by H. and D. S. Morton. This is a textbook used in Great Britain for teaching youngsters who expect to become coal miners and mature workers who want to advance to higher positions. It deals mostly with basic physical science, covering such subjects as hydrostatics, mechanics, heat, electricity and magnetism, air and gases, coal chemistry, explosions and explosives. **250 pp. 6x9-in; boards. $5, Anglobooks, 475 Fifth Ave., New York 17.**

British Mining Management

Colliery Working and Management, by H. F. Bulman and Sir R. A. S. Redmayne (5th edition enlarged; 1st American edition). This is the story of coal mining in Great Britain from earliest times, with a specially written section covering developments since nationalization. The book describes mining methods and machines, as well as mining conditions, and dwells at length on the duties of managers and supervisors. Profusely illustrated, with a glossary of mining terms. **64 plus 393 pp. 7x10-in; boards. $10.50, Anglobooks, 475 Fifth Ave., New York 17.**

Managing Industrial Stores

The Industrial Store: Its History, Operations and Economic Significance,

THE GRAIN IN KING RED CROWN MEANS MORE COAL PER SHOT

No nitroglycerine no headache

More coal at less cost per shot . . . that's what KING RED CROWN gives you. Here's why: RED CROWN has a patented *granular* structure . . . and every grain contains a balanced explosive composition. This results in a slow, heaving, spreading action similar to that of black powder. You get more, better, cleaner lump coal with a minimum of slack . . . at less cost per shot. Smoke, fumes and downtime are cut to a minimum.

Write or phone today for a demonstration right in your mine. You'll find KING RED CROWN is the most effective, most efficient form of controlled-power ever provided in Class A permissibles.

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THE KING POWDER CO., INC.

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COAL MEN ON THE JOB . . .

BEVIER COAL CO., Macon, Mo.—Charlie Davis (left), pit foreman, John Bamman, chief electrician, and Howard S. Frisbie, superintendent.

by **Ole S. Johnson.** This account of industrial stores concentrates on the coal regions of northern West Virginia and western Pennsylvania. Besides standard documentary sources, the author draws heavily on personal interviews and field observations based on visits to 60 stores and conversations with executives, store managers, employees, labor-union officials and others. **171 pp. 6¼ x 9¼-in.; boards. No price quoted. Division of Research, School of Business Administration, University of Georgia, Atlanta, Ga.**

Other Books and Booklets

The following publications by the U. S. Bureau of Mines are available free upon request to Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. All are 8x10½-in; paper; mimeo.

Estimate of Known Recoverable Reserves of Coking Coal in McDowell County, W. Va., by J. J. Wallace, J. M. Provost, W. H. Tavenner, J. J. Dowd, R. F. Abernethy and D. A. Reynolds. R. I. 4924.

A Selected Bibliography of Coal Gasification, by R. M. Busche, H. R. Batchelder and W. P. Armstrong. R. I. 4926. 28 pp.

Theoretical Precision of Screen-Analysis Results, by J. B. Gayle. R. I. 4933. 9 pp.

Roof-Bolting the Delaware Aqueduct, by D. H. Platt. I. C. 7652. 9 pp plus illustrations.

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ONE call
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For every welding and cutting need!

TAKE HARDFACING ALLOYS, FOR INSTANCE . . . Your authorized Airco dealer handles more than twenty types of hardfacing rods — to combat abrasion . . . impact . . . heat . . . corrosion. Every type of wear problem! He can show you how one application may add 2 to 25 times longer service life to new or worn parts.

Every item is backed by AIRCO's reputation . . . and delivered promptly to your door!

Whether you want to buy . . . or simply seek information, check your Airco dealer first! Consult your classified phone directory (under Welding Equipment and Supplies) . . . look for this famous sign.

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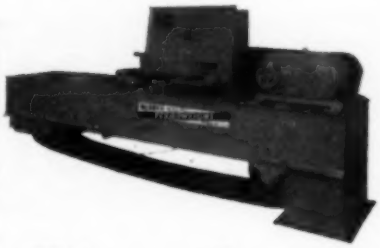


Yes-feed by weight

with the MERRICK FEEDOWEIGHT, a self-contained automatic conveyor scale, with automatic gate for feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Uniformly feeds bulk material BY WEIGHT; automatically totalizes weight of materials fed. Simple to operate. Slow moving parts mean long life. Easy to install, maintain.

Manufacturers of

The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveying operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.
Engineers and Mfrs. of Automatic Weighing Equipment
PASSAIC, N. J.

ON TARGET!

ACME

MINE COMPRESSOR

Track gauges adjustable from 42" to 48". Height 30", length 136", rail clearance 3", wheel base 48", width 66½".

AVAILABLE IN 4 NEW MODELS

130 CFM
168 CFM
210 CFM
275 CFM

Loadless starting

Full forced-feed lubrication

Low oil pressure shut down—high temperature shut down

Air cleaners featuring both oil bath and air scrubbers

Immediate delivery. Available on any type mounting.

ACME MACHINERY CO.

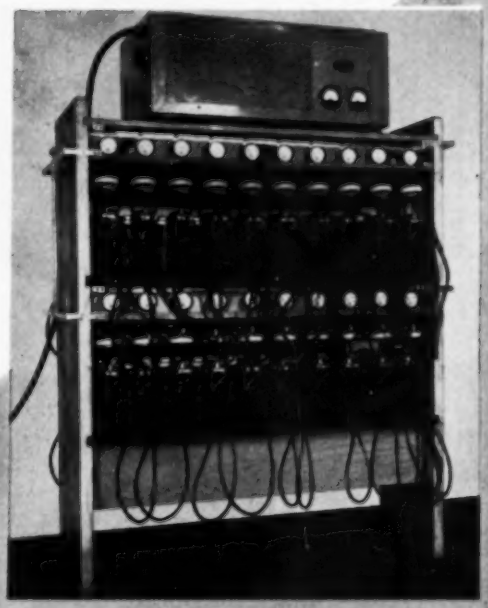
BOX 1169—WILLIAMSON, W. VA.—PHONE 1854

WITH **WHEAT** *and only Wheat—*

"AUTOMATIC LAMP CHARGING"

means what it says!

Yes, WHEAT has genuine automatic charging. Miners rack their own lamps—in seconds—and each lamp *automatically* goes on charge. The charging cycle is *automatic*—performed without attention—and each lamp takes only the current needed to complete its charge. That's true low-cost lamp operation, and you get it only with WHEAT. *Let us check over the facts with you.*



Electronically-Controlled Voltage Regulation

—no manual attention is involved

The WHEAT Automatic Charging Rack employs electronically-controlled selenium disc rectification which adjusts *automatically* for variations in line voltage and in number of lamps on rack. No rotating parts, no maintenance or manual attention required—a single lampman can check racks in widely separated locations as part of periodic lamp watering routine. Other Wheat units are available for a range of charging requirements. Write for descriptive Bulletin.

National Mine Service Company

Has the Facilities—Delivers the Goods

The Trend is to WHEAT!

6 Warehouses to Serve You

BEMECO DIVISION Beckley, W. Va.	**ALL-STATE DIVISION** Logan, W. Va.	**WHITEMAN DIVISION** Indiana, Pa.
KY.-VA. DIVISION Jenkins, Ky.	**ANTHACITE DIVISION** Forty Fort, Pa.	**WESTERN KY. DIVISION** Madisonville, Ky.

NEWS BRIEFS AND TRENDS

From p 136

LC&N Seeks Uranium Ore In Anthracite Region

Plans for a $30,000 test mine shaft and a geological survey to determine whether commercially minable uranium ore exists in sufficient quantity in Carbon and Monroe Counties, Pennsylvania, to warrant development have been announced by the Lehigh Coal & Navigation Co. "We plan to dig one tunnel to begin with," said Robert V. White, company president. "If the result is promising, we may add another." Experts from the Atomic Energy Commission have been interested in the area for several years, but tests so far have not been conclusive though it is known that uranium ore exists there, it is reported. An aerial survey of an area around Mauch Chunk, Pa., expected to take about 30 days, was started by the AEC Jan. 20. The plane is equipped with a special counter which records radio-active emanations as it flys low over reported deposits.

French Output Sets Record

French coal production in 1952 was estimated last month at 57,300,000 metric tons, topping the all-time record of 55,100,000 metric tons set in 1930. In 1951, some 54,900,000 metric tons was produced. An increase in output per man-day was responsible for the boost in output, even though there were some 8,000 fewer miners working at the end of 1952 than at the close of 1951. According to estimates, an individual French miner produced an average of 2,994 lb of coal a day in 1952; 2,875 lb in 1951; and 2,642 lb in 1950.

Ohio Geological Survey Offers Coal Research Program

Release of a report prepared to acquaint the coal industry and the general public with the present activities of the Division of Geological Survey in coal research, together with a program proposed to keep abreast of growing demands for Ohio coal and the increasing discrimination in its selection and utilization, was announced last month by A. W. Marion, director of the Ohio Department of Natural Resources. In addition to the conventional activities of geological mapping and resource studies, the research program proposes activities in coal petrography or anthracology, coal geochemistry, studies of fundamental physical and chemical structure, economic studies and applied research, to be carried on by agencies such as the state universities and federal bureaus in cooperation with the division. The 56-p report, issued as Information Circular 10, may be obtained without charge from the Division of Geological Survey, Orton Hall, Ohio State University, Columbus 10.

Violence Reported in Three Non-Union Areas

Dynamiting of mining equipment worth some $150,000 during the latter part of December reportedly resulted in an independent group of coal operators in Butler and Mercer Counties, Pennsylvania, posting a $10,000 reward for the arrest and conviction of those responsible. On Christmas night, a tipple of the Frederick & McCormick Coal Co., worth about $50,000, was destroyed, and on Dec. 30 a $100,000 dragline owned by the Lucas Coal Co., near Ridgeville, was blasted. The dynamitings are part of a campaign to force strip-mine operators in the field to deal with the UMWA, according to a representative of the independent operators.

In Kentucky, additional state police investigators were ordered Dec. 24 into Clay and Leslie counties, following a renewed outbreak of violence several days before. Destruction of one coal-hauling truck and damaging of another by dynamiting, together with two attempted dynamitings, was followed by

COAL MEN ON THE JOB . . .

HUNTSVILLE-SINCLAIR MINING CO., Huntsville, Mo.—Flexi Colo (left), assistant superintendent, Obie Dilldine, superintendent, and U. D. Rothwell, preparation-plant superintendent.

SAVE THIS AD!

if you buy mine pipe . . . you'll want this valuable information on MPC Wood-Lined Steel Pipe

APPLICATIONS: ideally suited for acid mine waters, culm, sludge and slurries.

PRESSURE RATING: up to 400 p.s.i., higher pressure ratings available on special order.

WOOD LINING: clear redwood, Douglas fir, pine or maple staves in thicknesses from 11/16" to 3".

STEEL SHELL: of carbon steel, available from 14 gauge through schedule 80 thickness.

FLANGES: welded to the pipe, carry ratings of 125 pounds upwards, with ASME bolt circle or special drilling.

LENGTHS: 10' and 20' stock lengths or fabricated to order.

INTERNAL DIAMETERS: 4" through 48".

PROTECTION: pipe exteriors can be protected to your specification.

FITTINGS: available for all diameters in standard and special designs.

For complete information write Dept. CA

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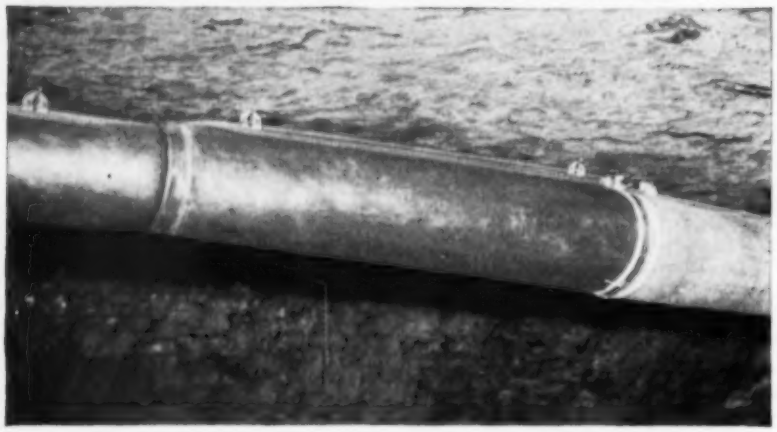
MICHIGAN PIPE COMPANY

Bay City • Michigan

Manufacturers of Wood-Stave, Saran Rubber-Lined, Stainless Steel and Monel Piping. Represented nationally by Saran Lined Pipe Co. Detroit, (Ferndale) Michigan.

SPECIFY

FLEXIPIPE® the quality ventilating tubing



Flexipipe is now available with Rope Seam Suspension *at no additional cost.* The newest, best, quickest suspension . . . eliminates special accessories and suspension wires . . . *all you need is a nail.* It equalizes strain on the tubing.

Flexipipe is efficient, serviceable, economical. Jute and heavy-duty grades available in a variety of lengths and diameters to meet your requirements.

Write for complete information and sample.

Bemis Bro. Bag Co.

408-O Pine St.,
St. Louis 2, Mo.

CONTROL Your Water Problems with the Flood City PLUNGER PUMP

Power end is made of hi-grade semi-steel with a large cover to facilitate inspection. All moving parts are completely self-lubricating. Intermediate shaft runs on adjustable roller bearings. Furnished V-Belt or Gear Drive. Size 5 x 5, Capacity, 50 gals. per minute, 2" suction and 2" discharge.

This pump uses the leak-proof, acid-resistant FLOOD CITY REVERSIBLE WATER END—standard for replacement purposes in large and small coal mines. Write for more information on this and other Flood City Mining Equipment.

Flood City Brass & Electric Co.

Messenger and Elder Streets · JOHNSTOWN, PA.

Branch Office: 4 Virginia St. W., Charleston, W. Va.

the shooting-up of an automobile sales agency in Hyden, Ky., which was said to own trucks hauling coal. Officials of the UMWA denied any part in the affair.

In Widen, W. Va., the scene of continued labor strife since last September, two parked cars belonging to employees of the Elk River Coal & Lumber Co. were blasted by dynamite Dec. 17. During the period, many members of the independent union which has a contract with company have reportedly continued to work, while another segment seeks affiliation with the UMWA. The car explosions were the first outbreaks of violence in about 6 wk, it was said.

Synthetic-Fuels Plants Again Pushed by Chapman

The synthetic liquid fuels program of the U. S. Bureau of Mines "again forged ahead in 1952," retiring Secretary of the Interior Oscar L. Chapman advised Congress Jan. 19 in his annual report on synthetic-fuels development. As he did last year, Mr. Chapman asserted that the Bureau's work and the research efforts of industry had advanced American technology so that it is now possible to begin the design and construction of prototype plants which could produce commercial quantities of important chemical products at reasonable prices. He recommended that governmental aid, such as provided for defense projects under the Defense Production Act, be made available to private industry to stimulate the construction of such plants. The Bureau's estimates cited by Mr. Chapman to show that oil could be obtained at a profit from both coal and oil shale have been seriously disputed by oil and other industry authorities.

Lehigh Navigation Announces Anthracite Fellowship

Samuel W. Llewellyn, a World War II veteran and former coal miner, is the first winner of the graduate fellowship in anthracite mining newly established at Pennsylvania State College by the Lehigh Navigation Coal Co., it was announced Jan. 8. "This fellowship has as its objective the aiding and encouragement of worthy and outstanding young men in pursuing graduate studies in the field of anthracite mining, and in developing new knowledge for the anthracite industry," said W. J. Parton, Lehigh Navigation general manager. The fellowship, effective Dec. 1, provides an annual grant for the tuition, travel, fees, equipment and other expenses necessary for graduate studies, and is open to graduates of any accredited college or university. Following his graduation from Penn State in 1950, where he majored in mining engineering, Mr. Llewellyn worked for 2½ yr as a contract miner at the Lansford colliery, returning to Penn State last September.

Lehigh Navigation to Use Good Housekeeping Seal

The Lehigh Navigation Coal Co. has added to its sales program "one of the

"Tycol Acylkup 'stays put'... keeps mine equipment rolling... smooths the way for heavier loads"

Absolutely right! Tycol Acylkup stays put . . . keeps mine equipment running in top condition — inside the mine and out.

Tycol Acylkup reduces low-temperature drag . . . retards lubricant leakage at high temperatures . . . permits the handling of more cars per haul.

Tycol Acylkup is firmly resistant to the washing action of water. Its dependable lubricating ability reduces maintenance costs.

Your nearest Tide Water Associated office will give you further information. Call or write today.

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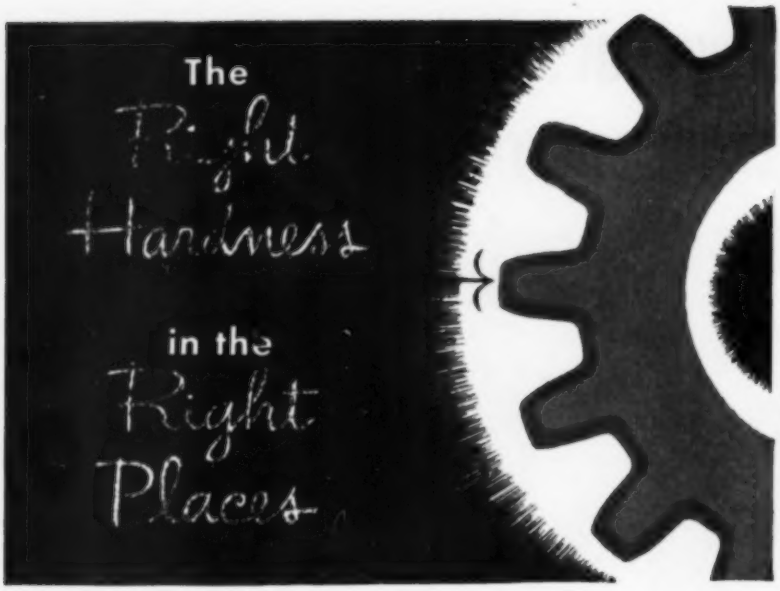
TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE • NEW YORK 4, N. Y.

SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"



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Guarantees Longer Life

Only PITTSBURGH **Armored Gears** are made according to the exclusive PITTSBURGH formula which covers a proven combination of metal, machining, AND heat-treating. It is not enough to use tool steel, which often will not stand shock loads. PITTSBURGH selects the best metal for the particular gear body, then machines it, and heat-treats the wearing surfaces to give ultimate life.

This process gives you gears that have tough, ductile cores, and teeth that wear almost interminably. PITTSBURGH **Armored Gears** are guaranteed to give five times the life of untreated gears, one to one and one-half times the life of oil-treated gears, and equal or longer life than any other gear in identical service. You can identify them by their "**Pittsburgh Purple**" corrosion preventive coating.

Your PITTSBURGH GEAR distributor carries standard renewal gears and parts for quick delivery. He will also gladly discuss special gears with you. If you don't know him, write us today for literature and his name.

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Blue Diamond Foreman Cited

AN UNUSUAL SAFETY RECORD was marked up by James D. Wender Jr. (above), preparation foreman, Leatherwood mine, Blue Diamond Coal Co., Leatherwood, Ky., according to a report by William B. Wright, safety foreman. Mr. Wender, with his assistant foremen, William E. Wright, Milford Minor and Milton Smith, were responsible for accumulating a total of 138,049 man-hours of exposure without a lost-time injury during a full calendar year at the preparation plant.

most powerful and influential tools" in retail selling and merchandising—The *Good Housekeeping* magazine "Seal of Approval"—for use with all consumer sizes of Old Company Lehigh premium anthracite, Glenn O. Kidd, sales vice president, announced Jan. 9. In use as a product endorsement for more than 40 yr, the *Good Housekeeping* Seal is a consumer's guaranty that states: "Guaranteed by *Good Housekeeping*, Replacement or Refund of Money if Not as Advertised Therein."

The company's first direct consumer advertisement in *Good Housekeeping* will appear in the March issue, reportedly the first anthracite coal advertisement in a national consumer magazine. The seal will be used in all Lehigh Navigation's consumer and cooperative advertising and dealer displays and will also be available for dealer use. In commenting on the program, Mr. Kidd said: "Our own recent consumer survey, made in the primary anthracite market, showed that women do most of the coal buying."

BCR Combustion Conferences Offered Coal-Consuming Groups

Bituminous Coal Research, Inc., announced Jan. 9 that it will assist in arranging combustion conferences for groups of power engineers, plant engineers, consulting engineers and others in important coal-consuming markets. Speakers are being made available and talks, slides and explanatory models have been prepared on several subjects. The first, dealing primarily with smoke

THIS IS THE DIESEL

for any mining job from 32 H.P. up

Whatever your mining job, there's a General Motors Diesel to supply the power. For General Motors Diesel engines now power more than 360 different models of mining equipment built by over 50 manufacturers.

Widespread demand for the 2-cycle GM Diesel engine results from its ability to get more work done faster and at lower cost. GM Diesel's fast acceleration boosts production. Smooth 2-cycle operation reduces wear and extends engine life. Convenient location of accessories simplifies maintenance. What's more, GM Diesels definitely cost less to maintain and repair. Replacing parts cost less, are highly interchangeable and are available everywhere. See your GM Diesel distributor or write us for full information.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS · DETROIT 28, MICHIGAN
SINGLE ENGINES...32 to 272 H.P. MULTIPLE UNITS...Up to 544 H.P.

It pays to Standardize on

Write for booklet, "A $10,000,000 Horsepower Insurance Policy" that tells you why.

GM
GENERAL MOTORS
DIESEL POWER

MOVE MORE COAL AT LESS COST

Atlas 5-ton type F 32" high.

Can be made 28"

The Atlas two-motor 5 ton type F storage battery locomotive is built low to go anywhere mine cars will go. Exposed wheels for easy access. Large battery capacity gives more gathering service per shift. Double reduction spur gear drive in heavy dust-tight housing gives economical maintenance-free service. Ask for details today!

Atlas Engineering service will design locomotives to meet the specific needs of your mine.

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

problems caused by deficiencies in overfire air and turbulence in industrial and commercial boiler furnaces, will be followed by discussions on such problems as coal and ash handling, combustion control, flyash collection and good engineering for coal-burning plants. To be conducted by outstanding engineers of the coal industry, the meetings can be sponsored by local organizations. Interested groups are invited to contact Charles H. Marks, of BCR's Columbus office, co-ordinator of the program.

And For Your Information. . . .

Ohio's Governor, Frank Lausche, reportedly has asked the Legislature to strengthen the state's strip-mine laws. Included in the request is more authority for the Division of Reclamation to promulgate and enforce rules and regulations, an increase in the present $190 an acre bond, and a requirement that operators do more work on mined-out areas, including grading of the final cut.

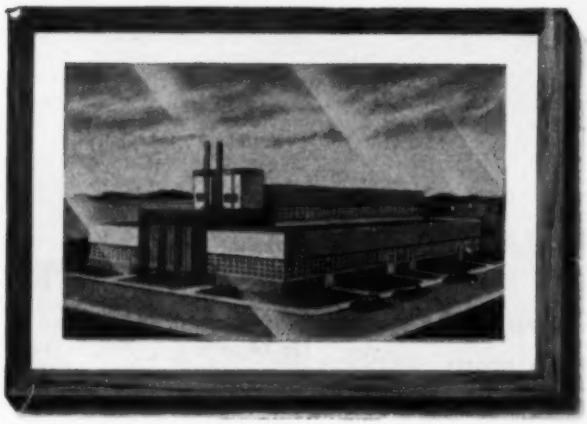
A gas turbine to burn methane now exhausted from ventilation shafts of British coal mines has been designed by government engineers in London, with the hope that it will provide much of the power used at the collieries. A recent survey showed that if only a fraction of the energy in the methane present in British mines could be utilized, it would be equivalent to 3 or 4 million tons of coal a year.

Power curbs on the Pacific Northwest were lifted partially Jan. 13 when the Defense Electric Power Administration removed the 10% cut in firm power put in effect Nov. 17. Heavy rains in the area, which had greatly improved the water supply for hydroelectric power, reportedly were responsible for the action. Restrictions on use of interruptible power effective Nov. 1 continue in force.

Tipple, conveyor belt and headhouse of the Harlan Fuel Co., Yancey, Ky., were destroyed Jan. 7 by a fire thought to have originated from a welder's spark. Damage, partially covered by insurance, was estimated at somewhat over $250,000 by C. S. Guthrie, general manager. The mine, which normally produces some 30 rail cars a day, will be closed for several months while the facilities are rebuilt.

Approval of 33 coal-mine projects costing an estimated $17 million from April 16 to Dec. 10, 1952, reported by the DSFA, makes a total of 204 projects costing about $182 million authorized by the DSFA since the beginning of the mobilization program. A majority of the new construction and improvement projects are designed to increase the output of metallurgical coal.

Preliminary report of 1952 earnings for the Island Creek Coal Co. showed a net of $2,840,000, or $2.26 a share of common stock, as compared to $5,705,369, or $4.67 a share, in 1951. Pond Creek Pocahontas Co.'s net for 1952 totaled $1,770,000, or $5.21 a capital share. Its 1951 net profit was $2,564,541, or $7.55 a share.



Whatever your fuel picture, *there's a B&O coal to fit it!*

• In the Baltimore & Ohio area lies a treasure-land of Bituminous—an almost inexhaustible source of low-cost heat and energy. Here are found Bituminous coals *of all varieties*—for power, for coking, for steam, for space heating.

B&O coals are excellent for generating steam in utility and industrial power plants, for steel mills, malleable iron plants, gas plants, lime and brick kilns, cement and glass plants, and potteries.

Whatever your "burning need," Industrial or Domestic, there's a B&O coal to meet it—and we are ready to help you find the best for your purpose. Just *ask our man!*

BITUMINOUS COALS FOR EVERY PURPOSE

LINKING 13 GREAT STATES WITH THE NATION ® B&O

BALTIMORE & OHIO RAILROAD

Constantly *doing things*—better!

800,000 TONS

without replacement

In the preparation plant at New Lexington, Ohio, of the Sunnyhill Coal Company, a Hendrick Flanged Lip Screen handled over 800,000 tons of coal in a 28-month period, and was still in good condition with slots free from blinding and corrosion.

Made of 12-gauge stainless steel, with 1/8" x 3/16" x 3/4" slots, this Flanged Lip Screen forms a 7' x 24' bottom deck of a three-deck shaker, dewatering and sizing wet coal to 1/4" x 0. Operating conditions are severe, 8,000 gallons of water a minute passing through the shaker. With the type of screen used previously, continuous operation was not possible because of blinding.

To meet varying requirements, Hendrick Flanged Lip Screens are made in 150 standard sizes of slots of small, medium and long types. Write for full information.

SEE OUR CATALOG IN SWEET'S

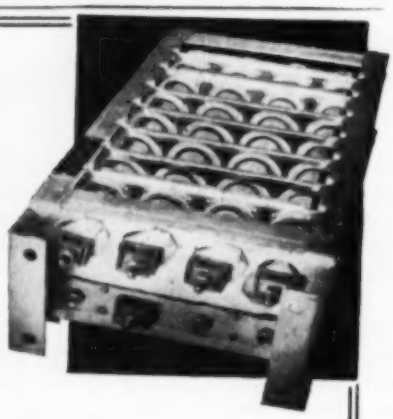
HENDRICK
Manufacturing Company

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

41 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

GUYAN RESISTORS *for* LOADERS



GUYAN Loader Resistors are built into a light but sturdy frame-work—have same ohmic resistances as specified by the loader manufacturer and have ample current capacity to prevent burn-outs. Designed to fit original mountings.

All terminals are easily accessible, plainly marked and conform with original wiring diagram.

★

For a complete range of quality, long life resistance products investigate the GUYAN line. Write today.

★

GUYAN MACHINERY COMPANY
LOGAN, W. VA.

Some 500,000 German coal miners won a reduction in daily working time from 8 to 7½ hr without loss of pay Jan. 16, after threat of a nationwide strike that was reported as organized labor's first test of strength since the war. Organized labor groups have largely played a passive, neutral part politically since formation of the Federal Republic in 1949.

MANUFACTURERS . . .

From p 142

and chairman of the executive committee, and James H. Knowles, president. Mr. Smith has been with the company since 1915 and Mr. Knowles since 1947.

National Mine Service Co., Pittsburgh, has made the following personnel changes, effective Jan. 1. W. C. Campbell, manager of mining sales, Whiteman Div., Indiana, Pa., was named sales assistant to the president, and will continue his headquarters in Indiana. J. E. Ward, manager, Anthracite Div., Forty Fort, Pa., was made district sales manager, Whiteman Div. and Anthracite Div. Robert Yaple, manager, warehouse sales, Bemeco Div., Beckley, W. Va., was appointed district sales manager for the Bemeco Div.; the All-State Div., Logan, W. Va.; and the Kentucky-Virginia Div., Jenkins, Ky. F. M. Gates replaces Mr. Yaple. H. J. Ubbing, manager, used equipment, was named manager, used equipment and rebuilding sales.

J. R. Alexander has been named general sales manager, Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia. Mr. Alexander, who will be in complete charge of the company's sales activities, came to Quaker as a sales representative in 1944 and has been successively city sales manager and district sales manager.

Newcomer Products, Inc., Latrobe, Pa., has announced revision of its mining tool sales distribution, with all customers to be serviced directly by the company instead of through jobbers and suppliers. Initiated as a part of a manufacturing expansion program begun several months ago, the plan is expected to result in faster and more efficient customer service. Newcomer mining engineers are available for direct service and consultation and all inquiries should be referred to the company at its general sales offices, 514 Franklin Ave., Pittsburgh 21.

Post Glover Electric Co., Cincinnati, has announced that John M. Van Winkle has sold his interest and retired as president of the company. New officers of the organization are: Clarence E. Nuckels, president; Marvin A. DuBois, vice president in charge of engineering; Thomas R. Gano, vice president in charge of sales; and Edward A. Vosmer, Jr., secretary-treasurer. Joseph H. Thiem has been elected to the board of directors, and Robert W. Houp has been appointed sales manager.

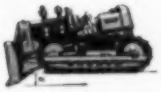
Louis Allis, Jr., formerly vice president in charge of sales, has been elected a vice president of the Louis Allis Co.,

More Push at the Blade!

NEW 15X DOZER! (No Pushbeam)

More Powerful, More Rugged, but Still Highway Width!

Higher, Faster Lift—full 39½ inches above ground. Unusually good center of gravity affords excellent leverage and maximum traction with blade in any position.



Deeper, Faster Bite—full 15½ inch drop below ground. Positive down pressure, elimination of "bounce", and steeper approach angle puts—and keeps—blade down deep.

Baker's revolutionary, no pushbeam, highway width 9X dozer proved that *it could be done!* Now . . . Baker presents a *bigger, more powerful* edition—the Baker 15X—combining the famous Baker "roll action" 96 inch-wide blade with the 109 drawbar hp of A-C's HD-15.

The successful result of painstaking design and exhaustive testing, the big-capacity 15X utilizes Baker's specially engineered hydraulic lifting mechanism to direct every ounce of horsepower to where it counts most—*at the dozer blade!*

Now! . . . ask your Baker, Allis-Chalmers dealer for complete information about this completely new Baker 15X.

THE BAKER MANUFACTURING COMPANY, SPRINGFIELD, ILLINOIS

Check These Features!

• Legal Highway Portability—only 96" wide • Big Yardage Moldboard • More Horsepower at the Blade • Sure Footed—greater track oscillation • Working Center of Gravity • "Operator-Ease" Control • Design for Easy Servicing • Lighter—Less Cost.

Always Look to Baker for the Next Advancement—First

NOW—3 MODELS

of the efficient time-proved

NOLAN PORTA-FEEDER

1 DIRECT MECHANICAL DRIVE
Shown in Illustration Below

2 HYDRAULIC FLUID MOTOR DRIVE
Hose Coupled to Remote Power Unit

3 HYDRAULIC CYLINDER TYPE
Hose Coupled to Remote Power Unit

These three Nolan models will help you meet every requirement and condition in spotting cars for loading . . .

and may save you as high as 40 minutes per shift!

The Nolan Porta-Feeder has been in successful use in many mines for over two years. This modern method of moving cars has been accepted as the most efficient in the industry. Its ease of installation and quick movability recommends its use in any mine.

The Porta-Feeder mounts between the rails on top of the track ties, and is secured by jacks. Little or no excavation or preliminary foundation work is necessary. The construction is strong and massive. There are no ropes or cables. Reciprocating pushing dogs deliver constant forward feeding motion. We will be glad to show you a mine in your vicinity where the Nolan Porta-Feeder is operating. Write us now.

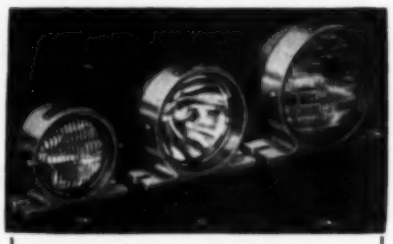
NOLAN

THE NOLAN COMPANY 106 PENNSYLVANIA ST. BOWERSTON, OHIO

COAL MEN ON THE JOB . . .

OZARK PHILPOTT MINING CO., Ozark, Ark.—Arkie Massengale (left), blasting supervisor, M. H. Busby, superintendent, William R. Driscoll, engineer, E. J. Robison, office manager, and C. A. Hyser, storekeeper.

joining with his brother in the over-all management of the company. He has been with the company 14 yr, exclusive of service in the Army and 2 yr with the WPB in Washington. C. G. Skidmore, sales manager, was elected vice president in charge of sales, to succeed Mr. Allis. Prior to joining the company



GUYAN *Sealed Beam*
HEADLIGHTS for MINE EQUIPMENT

GUYAN Sealed Beam Headlights are made in three sizes to meet various mining conditions. The voltage rating is 6 volts for all three types. To operate from 250 or 500 volt trolley voltage we can furnish either a resistor or a power unit.
Type 4 IN is recommended for gathering locomotives, shuttle cars and loading machines.
Type ML for main line locomotives has a narrow, powerful beam (70,000 beam C.P.)
Type 7 IN is a utility headlight using standard automobile lamp, two filaments, to project the beam either close or far.

Write for Bulletin

GUYAN MACHINERY CO.
LOGAN . . . . West Virginia

Make Your Own Hose Lines

AEROQUIP HOSE AND FITTINGS ARE MATCHED FOR GUARANTEED PERFORMANCE

● No skill or special training is required to assemble Aeroquip Flexible Hose Lines by hand *in a matter of minutes!* YOU CUT COSTS because Aeroquip fittings are detachable and may be used again and again. YOU REDUCE INVENTORY because with Aeroquip bulk hose and a few fittings you can fill practically all your hose line requirements. YOU REDUCE DOWNTIME because with Aeroquip on hand, quick hose line replacements are available at all times.

Cut hose to length with hacksaw; screw into socket.

Oil nipple and inside of hose liberally.

Screw nipple into socket and hose.

Install fitting on other end; hose line is ready for use.

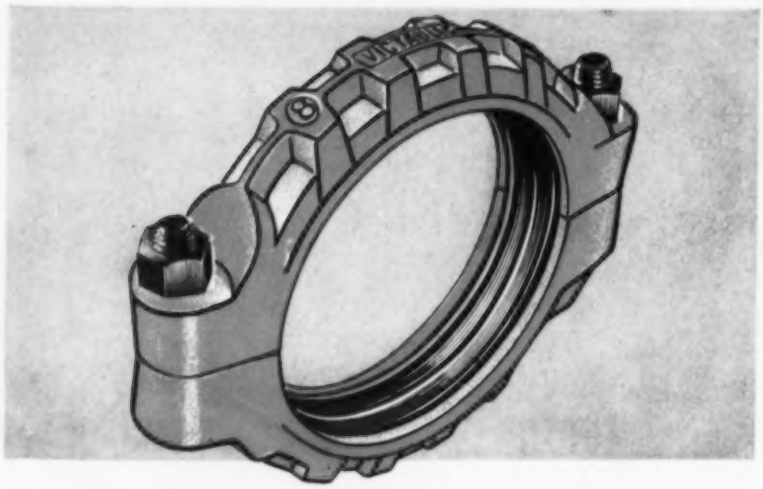
Aeroquip

REG. TRADE MARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

SALES OFFICES: BURBANK, CALIF. • DAYTON, OHIO • HAGERSTOWN, MD. • HIGH POINT, N. C. • MIAMI SPRINGS, FLA.
MINNEAPOLIS, MINN. • PORTLAND, ORE. • WICHITA, KAN. • TORONTO, CANADA

AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD



THE EASIEST WAY TO MAKE ENDS MEET

VICTAULIC COUPLINGS FOR LOCK-TIGHT LEAK-PROOF CONNECTIONS AT EVERY JOINT UNDER PRESSURE, STRAIN OR VACUUM, ARE ONLY PART OF THE COMPLETE, MODERN VICTAULIC 4-STAR ☆☆☆☆ METHOD OF PIPING. YOU ARE ASSURED FAST, EFFICIENT, STREAMLINED CONSTRUCTION THAT SAVES $$$$ WITH: VICTAULIC FULL-FLOW TEES ELBOWS AND ALL TYPES OF FITTINGS ALL WIDELY ADAPTABLE AND EASY-TO INSTALL; *PLUS* CONVENIENT, PORTABLE VIC-GROOVER TOOLS FOR GROOVING STANDARD PIPE ENDS WITH SPEED AND EASE; *AND* QUICK, HANDY ROUST-A-BOUT COUPLINGS FOR PLAIN END PIPE AND ALL-AROUND VERSATILITY! MAKE SURE YOUR NEXT JOB IS ALL VICTAULIC! PROMPT AVAILABILITY FROM LOCAL DISTRIBUTOR STOCKS COAST-TO-COAST.

Write today for Victaulic Catalogue-Manuals

VICTAULIC COMPANY OF AMERICA · P. O. Box 509 · ELIZABETH, N. J.

Office and Plant: 1100 Morris Ave., Union, N. J. • Telephone Elizabeth 4-2141

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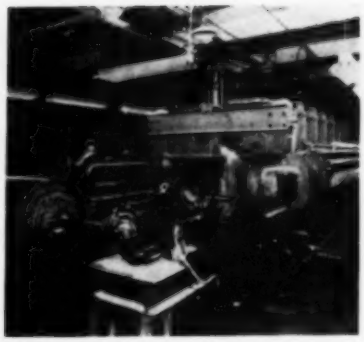


Two Large Presses Complete Quaker Rubber Expansion

INSTALLATION of two new large conveyor-belt presses, one 72 in (above) and the other 60 in wide, marks the completion of a $250,000 belt-department expansion at the Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia. With the new presses, capable of producing belts as wide as 72 in, Quaker can now meet almost any requirements of industry with belt especially adaptable to handling of hard ores, coal, rock and other materials where maximum width belts are desirable, the company reports.

6 yr ago, Mr. Skidmore was chief of electric control section of the WPB.

Firth Sterling, Inc., Pittsburgh, has appointed Austin Powder Co., Cleveland, sales agents and national distributors for its Firthite "Blue Bit" mining tools. The Austin Powder Co. serves the coal-mining industry with 30 warehouses, in addition to their many magazines in mining centers. Also announced was the appointment of William E. Henry to the Firth Sterling sales department in the Pittsburgh district. Mr. Henry previously was employed by the Lakeview Mfg. Co., Latrobe, Pa. and the Joseph T. Ryerson & Son.

R. G. LeTourneau, Inc., Peoria, Ill., has named Harry R. Powers domestic sales manager, succeeding R. P. Nichols, who has joined the newly appointed LeTourneau distributor, Ryan Equipment Co., St. Louis. Mr. Powers, who has been in the equipment field for the past 30 yr, joined LeTourneau in 1945 and has been eastern area sales manager for the last 5 yr. A. M. Krider has been appointed general sales manager for central U. S. and central Canada, succeeding W. V. Richards, who has joined LeTourneau Distributor Great Plains Equipment Co., of Omaha, as manager, construction equipment sales. Mr. Krider, associated with LeTourneau for 10 yr, formerly was district sales representative for central Canada and north central U. S. He is succeeded by John Tuntas, who joined LeTourneau in 1949, and previously was parts representative in the parts coordinating department. John Sharda, sales engineer in the Tournarope Dept., has been appointed district sales

4 powerful reasons why you get more of what you want in 1953 CHEVROLET Advance-Design Trucks

MORE TRUCK FOR LESS MONEY! Chevrolet trucks list for less than any others of comparable specifications. Yet they bring you features and advantages found in few other trucks. For example, the advanced Loadmaster engine—standard in 5000 and 6000 Series heavy-duty and forward-control models (optional on 4000 Series heavy-duty trucks)—now has a new high-compression ratio of 7.1 to 1, and delivers even more horsepower than before.

FACTORY MATCHED TO YOUR JOB! Every unit of the Chevrolet truck you buy is balanced to the job. Tires, axles, springs, engine, frame, body and brakes form a team carefully engineered for the greatest efficiency—and the lowest cost.

GREATER VALUE IN FEATURE AFTER FEATURE! Two great valve-in-head engines—the Thriftmaster and the Loadmaster—provide greater gasoline economy. Hypoid Rear Axle, Unit-Designed Bodies, Flexi-Mounted Cabs and many other Advance-Design features offer value unmatched by any other truck at such low cost.

MORE RUGGED THAN EVER! In 1953, Chevrolet trucks are even sturdier. Bigger, more durable brakes on many models; heavier, more rigid frames and stronger construction lengthens truck life and lowers your hauling costs. See your Chevrolet dealer. Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTI-PANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET

first in demand in value in sales

COLLYER
TWIN
PARALLEL
TYPE G
MINING
CABLE

COLLYER
COLLIERY
CABLES
CUT
COAL
COSTS!

For samples of Collyer Mining Cables and recommendations, write Collyer Insulated Wire Company, 245 Roosevelt Ave., Pawtucket, R. I.

CHOOSE Collyer

representative for Iowa, Illinois and Indiana, succeeding R. E. Dickerson, who held this position since 1948. Mr. Dickerson has joined LeTourneau Distributor Illinois Contractors' Equipment Co. as manager of the E. Peoria, Ill., branch office.

Le Roi Co., Milwaukee, Wis., has promoted C. H. Bouvy to chief design engineer and Henry C. Osterkamp to field research and development engineer for the Construction and Mining Equipment Sales Div. Mr. Bouvy, who was an engine designer with the Cadillac Div., General Motors Corp., before joining Le Roi in 1944, will be in charge of both engine and compressor design. In other changes announced, Merrill Sedgwick was promoted to manager, Tractair sales, and James B. Harwood, who started with Le Roi in 1950, will replace Mr. Sedgwick in the Michigan, Ohio and western Pennsylvania district. These new promotions, coupled with the recent promotions of Ray Rodolf to manager, rock drill sales, headquartering in Cleveland; C. L. Meigs, to assistant general sales manager, and Wm. D. Lund as assistant to the general sales manager, both in Milwaukee, are part of a long-range program for the improvement of its service to the construction and mining industry, the company reports.

Western Machinery Co., San Francisco, has announced the acquisition of Smith Booth Usher Co., Los Angeles, a regional distributor of construction machinery and equipment for more than 50 yr. It is to be operated as a division of Western Machinery Co., occupying the same premises at 2001 S. Santa Fe Ave., with substantially the same personnel. Herbert J. Mayer, general manager, industrial sales div., was named acting manager of the new division. Also announced were the addition of Mr. Mayer; Ralph B. Utt, general manager of the WEMCO Div.; Edward J. Barshell, controller; and Arthur P. Shapro, attorney, to WEMCO's board of directors. Harry N. How, founder of the company and its president since 1915, was advanced to chairman of the board, and Jack How, his son, succeeded him as president and general manager. Mr. Mayer and Mr. Utt were elected vice presidents; Mr. Barshell became secretary; and Mrs. Harry N. How was named treasurer.

Athey Products Corp., Chicago, has appointed W. L. Davies eastern district representative, with a territory including Washington, D. C., Maryland and eastern Pennsylvania. Prior to his association with Athey, Mr. Davies was assistant to the director of NPA in Washington.

Eaton Mfg. Co., Cleveland, has appointed Samuel H. Wood manager of the Marion Forge Div. plant now under construction at Marion, Ohio. Mr. Wood joins Eaton after 18 yr as chief engineer with Timken-Detroit Axle Co.'s Forge Div., Detroit.

William F. Koch, manager of sales in the Salt Lake City office of Hercules Powder Co. for the past 22 yr, retired Dec. 31 after 38 yr of service. L. W. Ben Early, assistant manager since 1949,

"Is new American cost-cutting weapon... Pure Oil Industrial Lubricants"

Pure Oil specializes in top-quality industrial oils and greases designed to do several *different* jobs—instead of one specific job.

And to do each job *equally well.*

Regardless of the type of machinery you have in your plant, our industrial engineers can nearly always help you to reduce your lubricants inventory . . . simplify your lubricating procedure . . . minimize waste and error.

Mail coupon today for free "Simplify and Save" booklet giving full details on how to start a labor-saving, money-saving, lubrication program in your plant.

Hundreds of machines . . . only one grease!

A large midwestern metal-working plant produces chrome-plated trim (hub caps, grills, etc.) for the automotive industry. All types of metal-working equipment—400-ton presses, shears, drills, lathes, roller-levelers and grinders—are used as well as huge chrome-plating machines. Yet *only one grease*—Pure Oil's POCO HT GREASE B—and one dispenser is used for *all* applications! And in 3 years there has been no down time due to lubrication failures.

THE PURE OIL PURE COMPANY, U.S.A.

Be sure with Pure

The Pure Oil Company Industrial Sales Dept. C-32
35 East Wacker Drive, Chicago 1, Illinois

Please send me your free "Simplify and Save" booklet.

Name _____

Position _____

Company _____

Address _____

City _____ Zone _____ State _____

***Sales offices located in more than 500 cities, including:** Atlanta • Birmingham • Charleston • Charlotte • Chattanooga • Chicago Columbus • Indianapolis • Jacksonville • Madison • Memphis • Miami • Milwaukee • Minneapolis • Pensacola • Pittsburgh • Richmond

It's Easy to See

PLASTEX *Yellow* PIPE

is safer

There's no mistaking PLASTEX Yellow pipe—it's easy to distinguish, easy to trace . . . provides maximum protection against accidental damage or becoming fouled with other equipment.

always visible

PLASTEX Yellow pipe fairly glows in dark mine passages—never loses its striking identity. Color goes all the way through, won't fade or stain and resists dirt accumulations.

longer lasting

In addition to the proven advantages of lightweight, flexibility and guaranteed service against rust, rot and corrosion, PLASTEX Yellow pipe lasts even longer with less maintenance because it practically eliminates the risk of damage caused by poor visibility.

The PLASTEX Pipe & Extrusion Co.
Columbus 3, Ohio

PLASTEX PIPE
CORROSION PROOF

Specify PLASTEX *Yellow* for better, safer mine piping.

succeeds Mr. Koch. Joining Hercules in 1914 as a salesman in the Pittsburgh office, Mr. Koch moved a year later to Salt Lake City as a sales and service representative, and in 1931 was named manager. A mining engineer, Mr. Early joined Hercules in 1937, and was explosives sales service representative, and later resident manager in the company's Los Angeles office for 6 yr, prior to transferring to Salt Lake City in 1948.

Sam Dupree, assistant manager, industrial products div., Goodyear Tire & Rubber Co., Akron, Ohio, since 1947, has been named assistant to R. S. Wilson, vice president in charge of sales. Mr. Dupree, who joined the company in 1934, will serve as Mr. Wilson's liaison executive with the company's industrial products, shoe products, chemical and steel products divisions.

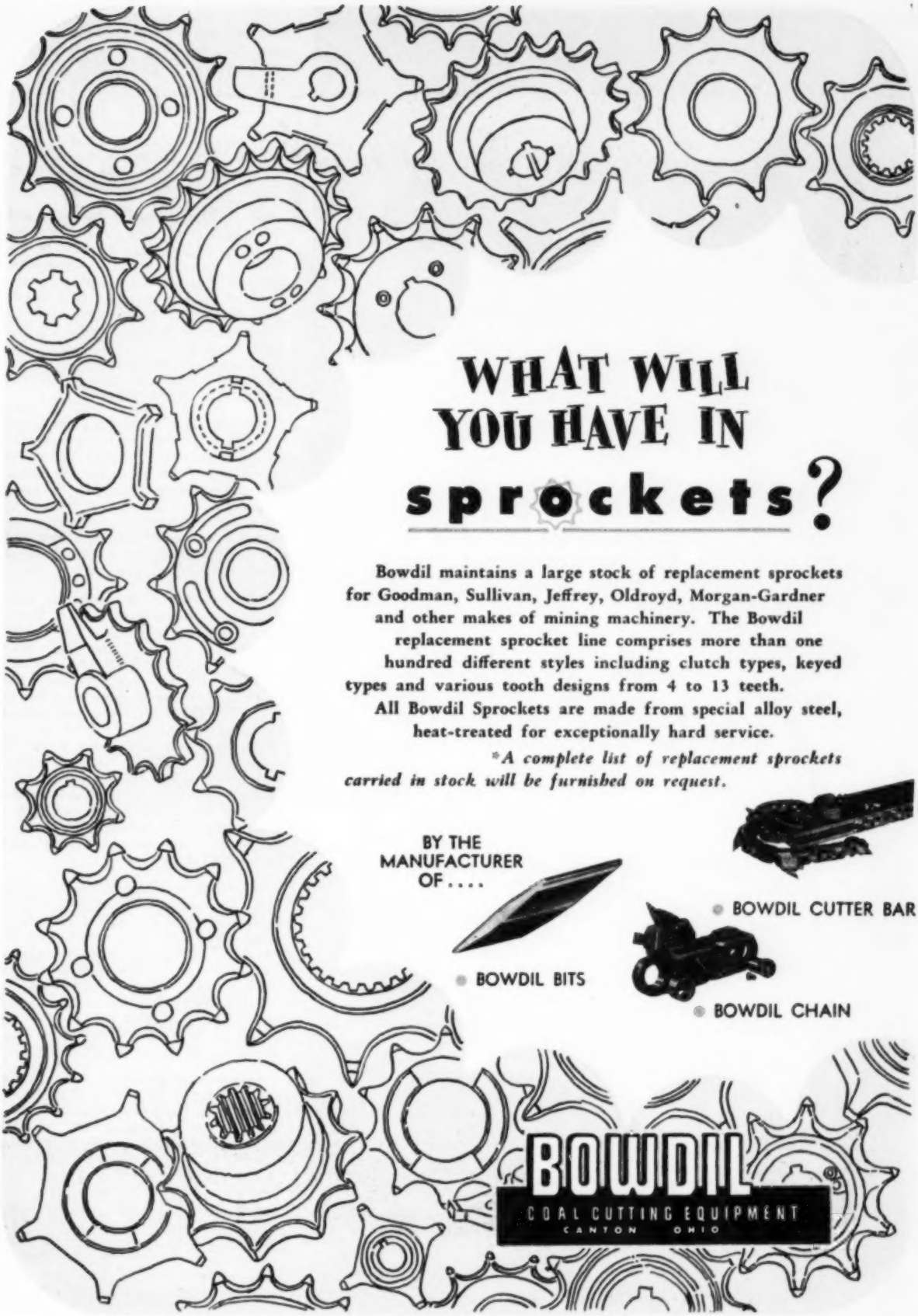
Fred L. Keller, general manager since 1951, has been elected vice president of Everson Electric Co., Allentown, Pa. He joined the company in 1941 as a sales representative, and became sales manager in 1949. Other changes include the appointment of Paul W. Rubrecht as the supply-department manager and David B. Everson as sales-promotion manager.

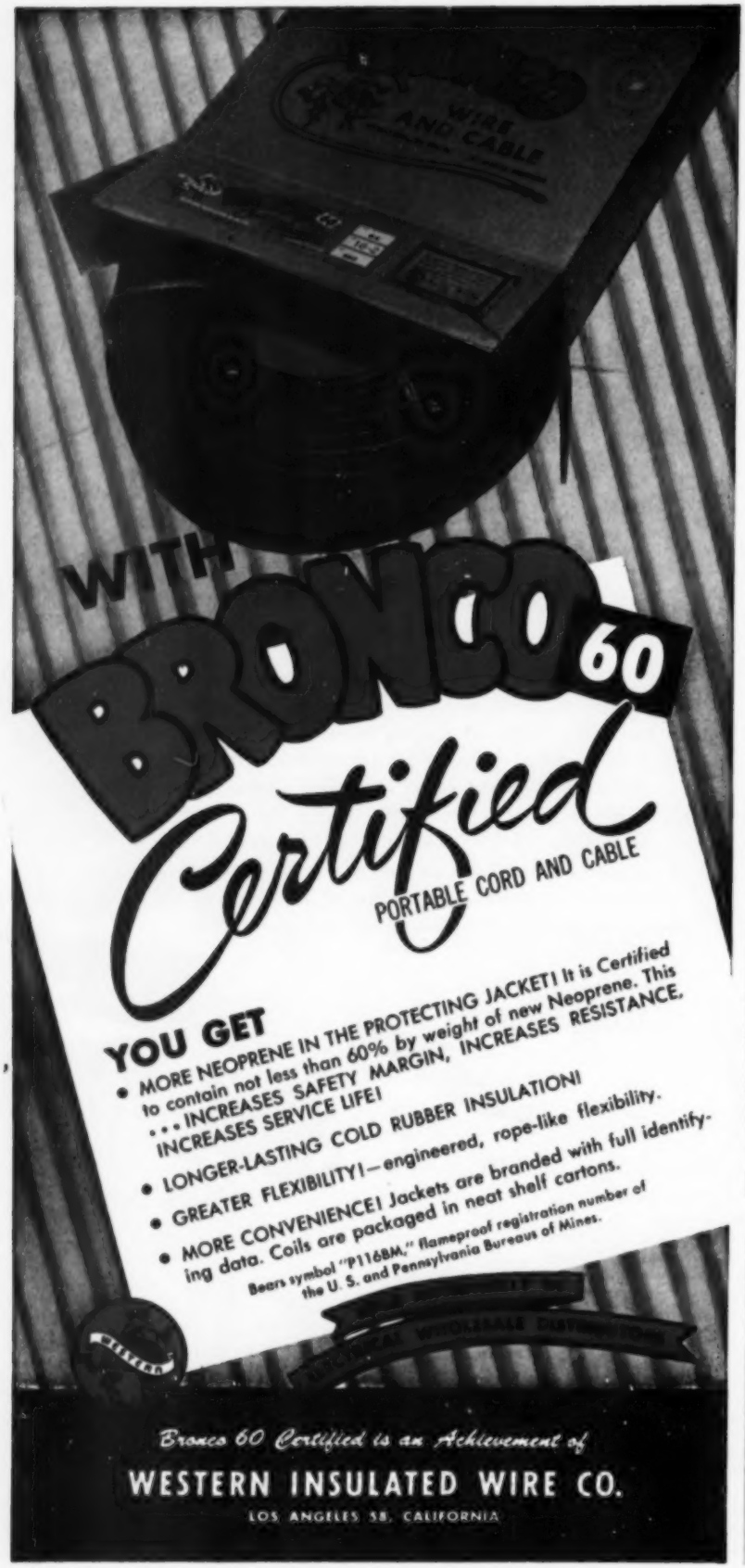
General Tire & Rubber Co., Akron, Ohio, has promoted Paul E. Nelson, Akron Div. sales manager for the past 2 yr, to the new position of manager of fleet and national sales, directing the handling of fleet and national sales accounts for General's commercial sales division. Mr. Nelson joined the company in 1944 after working for the Socony Vacuum Oil Co. and the Electric Autolite Co.

Vascoloy-Ramet Corp., Waukegan, Ill., has announced the following organization appointments, as its extensive plant expansion program nears completion: John M. Allen, sales manager, eastern region; Burton Naden, sales manager, central region; Quentin H. Castricone, sales manager, western region; Russell O. Moore, sales manager, mining tools; Dwight F. Clark, sales manager, investment castings; L. K. Adams, manager, export sales; and Clifford J. Nauta, manager, sales promotion and publications.

The Electric Products Co., Cleveland, has announced the establishment of the E. P. Switchboard and Control Div., consolidating all switchboard and control functions, engineering and manufacturing as a distinct unit, as part of an expansion program initiated several years ago. G. J. Doss, with the company since 1946 and formerly assistant sales manager, has been named general manager of the new division.

American Pulley Co., Philadelphia, has announced the following appointments: Henry H. Hamilton, advertising manager, to assistant manager, Materials Handling Div.; Joseph C. Salette Jr., district manager, St. Louis office, to sales promotion and advertising manager; George L. Michel, formerly sales engineer with E. F. Marsh Engineering Co., to district manager, St. Louis office; Samuel S. Stuart, formerly district manager, Boston office, to district manager, Philadelphia terri-


WHAT WILL YOU HAVE IN sprockets?
Bowdil maintains a large stock of replacement sprockets for Goodman, Sullivan, Jeffrey, Oldroyd, Morgan-Gardner and other makes of mining machinery. The Bowdil replacement sprocket line comprises more than one hundred different styles including clutch types, keyed types and various tooth designs from 4 to 13 teeth.
All Bowdil Sprockets are made from special alloy steel, heat-treated for exceptionally hard service.
*A complete list of replacement sprockets carried in stock will be furnished on request.
BY THE MANUFACTURER OF....
BOWDIL CUTTER BAR
BOWDIL BITS
BOWDIL CHAIN
BOWDIL
COAL CUTTING EQUIPMENT
CANTON OHIO



tory; and John J. McFarland, formerly sales engineer of eastern territory, Illinois Lock Co., to district manager, Minneapolis office.

The Euclid Electric & Mfg. Co., Madison, Ohio, has advanced R. G. Schrock to executive vice president. Mr. Schrock started with the company 30 yr ago, running a lathe. He advanced to foreman and then to superintendent and in 1936, was elected a vice president.

D. T. Marvel has been appointed vice president of sales, Olin Industries, Inc., with responsibility for sales in the arms and ammunition, metals, explosives, electrical, Ramset and export divisions. Previously sales manager of Olin Metals Div. since 1950, Mr. Marvel came to Olin from the National Tube Co., in 1940. Named marketing manager was C. L. Whittemore Jr. who recently joined Olin after 14 yr with Socony Vacuum Oil Co. Inc., Lubrite Div.

Motorola Inc., Chicago, has announced the organization of a wholly owned subsidiary corporation, Motorola Communications and Electronics, Inc., to distribute products manufactured by the communications and electronics division of the parent corporation. No change is contemplated in the field sales personnel and the operations of the other divisions of Motorola are not affected.

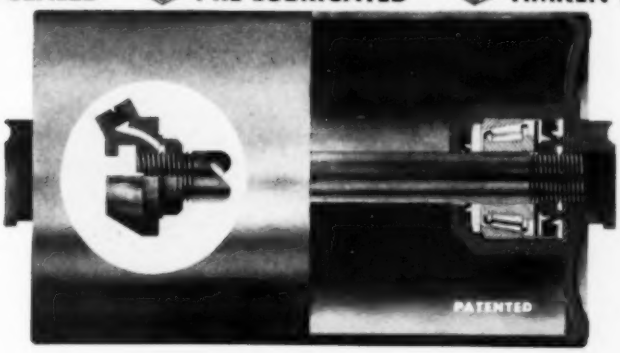
Colorado Fuel & Iron Corp., has completed the acquisition of John A. Roebling's Sons Co., Trenton, N. J., which will be operated as John A. Roebling's Sons Corp., a newly-formed and wholly-owned CF&I subsidiary. At a meeting of the board of the new corporation, Charles Allen, Jr., CF&I chairman, was named chairman of the board; A. F. Franz, CF&I president, was named president; and Charles Roebling Tyson, executive vice president. The present 11 members of the CF&I board were elected to the Roebling corporation board, in addition to Mr. Tyson, who served as president of the Roebling concern from 1944 until its acquisition.

Simplex Wire & Cable Co., Cambridge, Mass., has announced plans to establish a branch factory at Newington, near Portsmouth, N. H., for the manufacture of submarine cable. Present plans call for construction of a modern factory on a 100-acre tract and the employment of 200 persons. Operations, which are expected to begin late in the year, will be carried on by the Submarine Cable Div. of the company.

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio, has opened a new district office and warehouse at 1503 Northside Dr., N. W., Atlanta, Ga., replacing the office-warehouse Memphis, Tenn., to offer better facilities for customers in the southern territory. Fred L. Maus will continue as district manager of the territory. The division also announced the appointment of W. M. Huston, as manager of engineering of shovels, cranes and crushers for the Lima Div. E. G. Halby succeeds Mr. Huston as chief engineer of shovels and cranes.

You Need... CONTINENTAL'S NEW UST Idlers

UNIT-SEALED **PRE-LUBRICATED** **TIMKEN BEARINGS**



Saves Grease!
Saves Labor!
Saves Belts!
Long Life- **THE ULTIMATE IN MINIMUM MAINTENANCE**

Continental's Unit-Sealed "UST" Conveyor Idlers, incorporating Timken Bearings, Garlock Klozures, are the answer to the operator's prayer.

The Unit Bearing Assemblies—"sealed unto themselves" provide an ample but not excessive grease reservoir. This represents a saving of grease and further eliminates any possible migration of the grease from upper to lower bearings on inclined rolls. The lubricant is a top quality water repellant grease of a stable consistency with a wide temperature range for long life.

Most important—this construction permits operating the Continental "UST" Idler for extended periods of time without relubrication for 1-2-3 years or longer depending upon the severity or character of conditions.

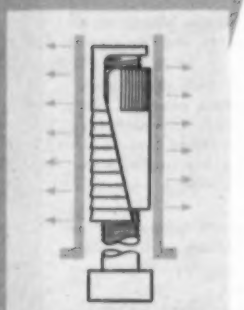
For detailed information on these idlers write for Bulletin CA-116

CG—5210

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC **MANUFACTURERS**

For Greatest Safety...



Parallel Expansion . . . the same from top to bottom.

HUBBARD
EXCLUSIVE PARALLEL EXPANSION
ROOF BOLT

THE design of the Hubbard Mine Roof Bolt embodies marked advantages over other types of roof support, in ease of installation, tested holding strength, adaptability to conditions encountered, and provision for maximum head working room and haulage-way clearance. Note these distinctive features:

1. The sides of the shell are constantly parallel during expansion, giving full length gripping surface, not dependent on point contact.
2. The bolt does not have to be inserted to the full depth of the hole or to an exact, mathematically predetermined depth. This makes it possible to take advantage of the strata at any chosen depth and shows up in decreased drilling costs.
3. Torsion while tightening the bolt can be varied to any determined degree to give a desired resultant tension.
4. If holes are not perfectly straight, the Hubbard Bolt will enter where many others will not, and no installing tool clearance is required.
5. The Hubbard Roof Bolt gives maximum head room; only the bolt head and support plate project below the roof.
6. The Hubbard Roof Bolt is the simplest in design, the easiest and quickest to install. No special tools are required.

HUBBARD ROOF BOLT COMPANY

25th Street and Guyan Ave., Huntington, W. Va.

"Hang the Load on Hubbard Hardware!"

Your Assurance of Better Performance

Magnetic Reel Contactor

All this . . . in a P-G Contactor

- Easy to install.
- Affords control of reel motor with only a small toggle switch.
- Removes flashing arc from operator's hand.
- Spring opening of contacts.
- Adjustable terminals.
- Coil and contacts are interchangeable with P-G Automatic Transfer Switch.
- Rated at 5 H. P. at 250 volts D. C., 10 H. P. at 550.

Type 48RM contactor was designed primarily for use on mine locomotives for Reel Motor control. However, it may be used wherever remote control is desired of a circuit of appropriate rating and type.

For further information, write for Bulletin #1300.

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

54 YEARS

CUSTOM-ENGINEERED MINE CARS . . .

ENTERPRISE

WHEEL AND CAR CORPORATION
BRISTOL, VIRGINIA - TENNESSEE
HUNTINGTON, WEST VIRGINIA

THIS SCALE CAN BE MOVED FROM JOB TO JOB, AS A UNIT

Also, can be installed as a pitless scale, saving expensive concrete pit-construction costs.

- **Capacities**
  20, 25 & 30 Ton
- **Platform Lengths**
  18, 22, 24 & 30 ft.

THE
THURMAN PORTABLE TRUCK SCALE

Est. 1918

ACCURATE and PORTABLE

This scale can be transported, assembled, from one job to another by removing six bolts which hold the side levers in place. The complete scale can then be lifted as a unit and loaded onto a truck as a unit. It can be readied for use in minutes.

WIDE STEEL BASES

This scale requires no concrete footing. The steel bases at both ends support the scale perfectly. The easy-to-read weighbeam is chrome-plated. Other vital parts are electroplated against corrosion. Write for additional information and prices.

Other Thurman weighing equipment: Pit Scales—Pitless scales—Wheelbarrow scales—Warehouse scales, to fit your requirements

THURMAN MACHINE CO. *SCALE DIVISION* 156 North Fifth Street Columbus, Ohio Dept. B

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

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$1.20 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.
POSITION WANTED & INDIVIDUAL SELLING OPPORTUNITY undisplayed advertising rate is one-half of the above rate, payable in advance.
PROPOSALS, $1.20 a line an insertion.

INFORMATION:
BOX NUMBERS care of publication count as 1 line additional.
DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).
EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style.

DISPLAYED RATE:
The advertising rate is $9.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. C.A.

NEW ADVERTISEMENTS: Address N.Y. office, 330 W. 42 St., N.Y. 36, for March issue. Closing February 13th.

FOR SALE

3—Model UD 24 Diesel Power Units, Serial No. 628 and 636, 1200 RPM with International Engine, Century Generator, 100 KW, 250 Volt, D.C.
1—All metal conveyor, complete with head and tail piece. Approx. 52"x70". Used.
1—Caterpillar Light Plant, skid mounted, Model D4600, 110 Volt, 30 KW, good condition.

FREEPORT GAS COAL CO.
Box 1085, Clarksburg, West Va.

If there is anything you want that other readers can supply
OR . . . something you don't want— that others readers can use—
Advertise in the
SEARCHLIGHT SECTION

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42 St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

PLANT ENGINEER for open pit coal mining and preparation. Graduate with 5 to 10 years' experience in design, drafting, and cost estimating for plant installations. Should be capable of supervising construction on all such projects. Must have a rather broad practical and technical knowledge of coal mining operations. Salary $6,000.00 a year to start—Location, Indiana—Needed at once. P-6567, Coal Age.

BUSINESS OPPORTUNITY

Strip Coal Wanted

Lease or purchase—large or small tracts. Morgan Coal Company, 2850 North Meridian Street, Indianapolis 8, Indiana.

WANTED

ANYTHING within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

WANTED
Diesel Powered Dragline

5 to 7 yd. capacity with 110-130 ft. boom. Advise make, age, Serial No., condition, price, approx. location.

Address P.O. Box 11, Linton, Indiana

WANTED
25 to 50 Mine Cars

42" gage, end dump, 10 feet long, 56 inches wide, not over 32" high, 14" wheels with brakes.

MYERS COAL CO., INC.
RANSON, W. VA.

BUYERS OF SURPLUS COPPER INSULATED WIRES AND CABLES

No lengths too long or too short
Telephone: Eastgate 7-4778
PIERCE CABLE CO.
2664 Clybourn Ave. Chicago 14, Illinois

CARLYLE

INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF CONVEYOR, OIL WASH AND TRANSMISSION BELTING — FIRE, WATER, SUCTION, AIR, STEAM AND WELD HOSE

WHY WAIT

We have 8 to 48

RUBBER CONVEYOR BELTING

TOUGH COVERS—heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.

STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.

FLEXIBILITY — Carefull attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily, runs true on all idlers, gouge resistant, excellent for long and short hauls and slope installations.

Avoid delays in your production schedules!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	5	1/8"	1/16"	32 Oz.
48"	8	1/8"	1/16"	32 Oz.

INQUIRE FOR SIZES NOT LISTED. ELEVATOR TRANSMISSION & V-BELTING ALSO IN STOCK.

All our belting made by the leading belting manufacturers.

Write for Free Booklet on Installation, Care & Maintenance of Conveyor Belting.

SEND US YOUR INQUIRIES FOR OTHER RUBBER PRODUCTS

CARLYLE RUBBER CO., Inc.
62-66 Park Place, New York 7, N. Y.
Phone Digby 9-3810

MOTOR GENERATORS

1—400 KW G.E. Syn. 575 V. 720 RPM
2—300 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW RIDGWAY Syn. 275 V. 1200 RPM
1—200 KW G.E. Syn. 275 V. 1200 RPM
1—200 KW RIDGWAY Syn. 275 V. 900 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM
1—100 KW RIDGWAY Syn. 275 V. 1200 RPM

ROTARY CONVERTERS

2—500 KW G. E. Syn. 275 V. 1200 RPM
1—400 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW G. E. Syn. 275 V. 1200 RPM
1—300 KW WEST. Syn. 275 V. 1200 RPM
1—150 KW G. E. Syn. 275 V. 1200 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM

NEW G. E. RECTIFIER

1—200 KW G.E. Sealed Ignitron Rectifier, Mining Stationary Type, 2300/4000 V. AC, 275 V. DC. Complete with AC Switchgear Cubicle, Rectifier Cubicle and DC Switchgear Cubicle. Equipment is thread connected to the main 235 KVA Rectifier Transformer, Rectifier Model #6RP40CAA30. Complete with water and air heat exchangers. Power Transformer and all other necessary accessories. Unit has never been in service.

LOCOMOTIVES

3—30 T JEFFREY 250 V. 3-MH-77, 48-36" Ga.
1—25 T G.E. 500/250 V. 3-HM-624-A, 44-36" Ga.
1—20 T JEFFREY 250 V. MH-77, 48-36" Ga.
1—13 T JEFFREY 250 V. MH-2154, 36" Ga.
1—13 T JEFFREY 250 V. MH-110, 48-36" Ga.
1—13 T JEFFREY 500 V. MH-110, 48-36" Ga.
1—10 T JEFFREY 250 V. MH-2110, 48-36" Ga.
2— 8 T JEFFREY 250 V. MH-100, 44-36" Ga.
1—10 T WEST. 250 V. ML-907-C 36" Ga.
3—10 T GOODMAN 250 V. 36-B, 36" Ga.
2— 8 T JEFFREY 250 V. MH-100, 42-36" Ga.
2— 8 T WEST. 230 V. ML-906-C, 44-36" Ga.
1— 6 T WEST. 250 V. ML-925-LK, 24" Ga.
3— 6 T JEFFREY 250 V. MH-58, 44-36" Ga.
2— 4 T GOODMAN 250 V. MS-4-E, 36-24" Ga.

LOCOMOTIVE MOTORS

2—JEFFREY 250 V. MH-77, Ball Bearing
3—WEST. 250 V. ML-906-C, Ball Bearing
2—WEST. 250 V. ML-906-C, Ball Bearing
3—GE. 500/250 V. HM-624-A, Ball Bearing
4—WEST. 80 V. V-40-X, Ball Bearing

Extra Armatures Available for Above Motors

WALLACE E. KIRK COMPANY

501 GRANT BUILDING — PITTSBURGH 19, PENNSYLVANIA

A Quarter of a Century Serving Mining and Industrial Companies

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We carry a large stock of transformers, and invite your inquiries. New Transformers built to your specifications.

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We rewind, repair and redesign all makes and sizes.
One Year Guarantee.

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SINCE 1912 — CINCINNATI 27, OHIO

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Joy Equipment
8-BU Joys
32E15 Shuttle Car
P115E Elevator
T-1 Trucks

Cutting Machines
35B Jeffrey
12AA, 12AB, Goodman
Universal 50 H.P., Goodman
7 AU Sullivan

Locomotives
6, 8, 10 Ton Jeffrey
6, 10, 13 Ton G. E.

Mine Cars
100 All Steel, 5 Ton Capacity

All equipment listed is for 42" T. G. and 250V, D.C.

All sizes A.C. and D.C. Motors
12 x 12 Centrifugal Recirculating Pump with 125 H.P. Motor
Rotary Converters, 150, 200, 300 K.W.

THE DOROTHY GORDON MINING COMPANY
Gordon, W. Va.

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Columbus, Ohio	Madison, W. Va.

FOR SALE

FOUR BRAND NEW JOY MACHINES IN STORAGE

1—10 RU Cutting Machine
1—14 BU Loader
2—10 SC Shuttle Cars
1—500 KW Westinghouse MG Set, Syn., AC2300, DC275, 1200 RPM. Complete with Switch Board.
2—150 KW General Electric MG Sets, Syn., AC2300, DC275, 1200 RPM. Complete with Switch Board and Automatic Circuit Breaker.
1—Ottumwa Hoist, 8" Conical Drum, 1 1/8" Rope, 300 HP Slip Ring Motor, 450' Shaft.
1—Smaller Hoist, 20-24" Double Drum, 80 HP Heavy Duty Reversible SP Westinghouse Motor, 220V
1—500' Chain Conveyor, 15", used very little with motor.
Four rolls 500 Circular Mills Covered Cable. One roll 1000 Circular Mills bare cable. One Roll 3 strand .04 Rubber Covered Cable.

Have ideal location for Slope Mine. Large Acreage, 160' Deep, 6' Coal (14,000 BTU). No Water, Sand, or gravel. Good Top. Would sell equipment and lease land to responsible parties.

A. M. Park, Lincoln, Illinois
Owner

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Tons 13" to 54" Track Gauge.
GREENSBURG MACHINE CO.
Greensburg, Pa.

FOR SALE

New 500 Gal. Skid Mounted STORAGE TANKS
Shell of ⅛" Steel, 2" Outlet and 12" Manhole in Top.
LEFTON INDUSTRIAL CORP.
212 Victor Street, St. Louis (4) Mo.

FEBRUARY SPECIAL

150 Kw West. Rotary Converter Set
275 V. DC, 1200 rpm, 6 ring, 60 cy. Complete. (trans. for 2300, or 6900 volt primary)
Also offer *200, 300 & 500 Kw* Sets
R. H. Benney Equipment Co.
5024 Montgomery Road, Norwood 12, Ohio

Ironton Electric Locomotives
New and used.
The Ironton Engine Company
Farmingdale, New Jersey

We have recently purchased several complete coal plants and have available an excellent stock of all types of machinery. Below is just a partial listing of our complete stock of mining, electrical and industrial equipment.

LOCOMOTIVES

1—1½ ton Mancha "Trammer", 18" ga.
1—2 ton Whitcomb, battery, 24" ga.
1—4 ton Mancha, battery, 24" ga., with Edison batteries and charging set
1—4 ton Ironton, battery, 36" ga.
2—7 ton G. E. permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, battery 36" ga.
4—10 ton Atlas, battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.
2—8 ton Goodman trolley, 36" ga.

COAL CRUSHERS

1—24" x 24" Jeffrey Single Roll
1—24" x 36" McNally-Pittsburg Double Roll
1—30" x 45" Jeffrey Single Roll
1—30" x 16" Williams Pulverizer
1—36" x 40" Jeffrey Double Roll
1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

2—5 HP Brownie Room Hoists
3—5 HP Sullivan RH single drum Room Hoists
1—7½ HP Sullivan double drum Slusher Hoist
2—10 HP Sullivan 3 drum Slusher Hoist
1—25 HP Sullivan 2 drum Slusher Hoist
1—Ingersoll-Rand Model 1H Air Tugger Hoist
1—Ingersoll-Rand Mod. 6HC Air Tugger Hoist
1—Ingersoll-Rand Model EU Air Tugger Hoist
2—6½ HP Sullivan Single Drum Air Tugger Hoist, 250 Volt DC
7—6½ HP Sullivan Double Drum Slusher Hoist, 250 Volt DC
1—Double Drum Sullivan Slusher Hoist Driven by Continental Gasoline Engine

ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box single drum
1—600 HP Box single drum

BOX CAR LOADERS

2—Ottumwa 20 HP Box car loaders
3—Maniere 22 HP Box car loaders
1—Jeffrey 20 HP Box car loader

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutters
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

2—8BU Joy loaders
2—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
10—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne Fans
1—Jeffrey 8 x 4 Fan
5—Jeffrey A61 exhaust blowers
8—Jeffrey Aerodyne midget blowers

SCALES

3—100 ton Fairbanks railroad scales
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

STORAGE BINS

3—50 ton capacity steel bins
2—100 ton capacity steel bins

TIPPLE EQUIPMENT

1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
1—4 deck card shaker screen, 18' long, driven by 50 HP motor
1—Card rotary car dumper
1—Bucket Elevator, 36'6" centers, 18" x 11" x 9" buckets.
1—Bucket Elevator, 45' centers, 6"x4" buckets
1—Bucket Elevator, 48'8" centers, 10" x 6" buckets
1—Jeffrey picking table, 19' centers, 36" wide
1—Jeffrey picking table, 19'8", 36" wide
1—Jeffrey Drag Conveyor, 88'6", 36" flights
1—Jeffrey Drag Conveyor, 72', 30" flights
1—Jeffrey Drag Conveyor, 67', 30" flights
1—Jeffrey Drag Conveyor, 69'6", 28" flights
1—Link Belt Drag Conveyor, 50', 15" flights
1—32" x 9'6" Card vibrating screen
1—4' x 6'6" Link Belt jig washer
1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
1—Loading boom, 55' centers, 48" flights
1—Loading boom, 45' centers, 30" flights
2—Card self dumping mine cages
2—Card 84" bicycle sheave wheels
1—24" Belt conveyor, 40' centers
1—24" Belt conveyor, 13' centers
1—24" Belt conveyor, 135' centers
1—24" Belt conveyor, 66' centers
1—30" Belt conveyor, 173' centers
1—Red Devil egg loader, 16" flights
1—Ottumwa nut loader, 16" belt

ELECTRIC CABLE

1368'—#10 Parkway cable 3/c, 7200 volt
2977'—#8 Parkway cable 3/c, 7200 volt
262'—#8 Parkway cable 3/c, 600 volt
1900'—#6 Parkway cable, 3/c, 7200 volt
970'—#2/0 Parkway cable, 600 volt
2,098'—#6 Tirex cable, 600 volt, 3/c
1417'—#4 Tirex cable, 3/c, 600 volt
547'—#2 Tirex cable, 3/c, 600 volt
1022'—#12 new Tirex cable, 4/c, 600 volt
5250#—300,000 CM stranded w.p. 1/c
14122'—#1/0 stranded r.c., 1/c
16682'—#4 stranded r.c., 1/c
2300'—#4/0 stranded r.c., 1/c
1705#—#4 solid bare
5467#—#2 solid bare
2600#—#1 solid bare
1255#—#1/0 solid bare
2975'—type TTHFA-60 new telephone cable

PIT CARS

160—60 cu. ft. coal mine cars, wooden sides, 42" ga.
125—60 cu. ft. Card steel coal mine cars, 36" ga.
88—66 cu. ft. Card steel coal mine cars, 36" ga.

SHUTTLE CARS

2—Joy Shuttle Cars, Model 42D5.

RAIL

16, 20, 30, 40, 52, 60, and 80# relaying rail in stock

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BARGAINS IN GOOD USED EQUIPMENT

MOTOR GENERATORS

2—300 KW West. Syn. 275 V 1200 RPM
3—200 KW G.E. Syn. 275 V 1200 RPM
These are 3 phase, 60 cycle, 2300/4000 V, complete with switchboards and full automatic AC and DC switchgear.

ROTARY CONVERTERS

2—300 KW G.E. Syn. 275 V 1200 RPM
1—250 KW West. Syn. 275 V 1200 RPM
2—200 KW G.E. Syn. 275 V 1200 RPM
1—100 KW G.E. Syn. 275 V 1200 RPM
These are complete with switchboards, switchgear, and single phase transformers for 2300 V.
1—300 KW West. Mine Type Rectifier

LOCOMOTIVES, 250 V DC, BALLBEARING

2—20-ton Jeffrey MH-77 4—13-ton G.E. HM-827
2—15-ton West. 910-C4 2—13-ton Jeffrey MH-110
2—15-ton West. 906-C 4—10-ton Goodman 34-B
2—15-ton Goodman 36-A 4— 8-ton G.E. HM-834 reels
5—13-ton Jeffrey MH-110 2— 6-ton Jeffrey MH-88.
2—13-ton G.E. HM-828 28" bt.
Complete with new Jeffrey steel strip resistances. All have been rebuilt and any part showing any wear was replaced with new. Guaranteed 100 per cent against electrical and mechanical defects.

STEEL TIPPLES AND WASHERS

1—6-Track Steel Tipple with Link-Belt No. 5835 Washer, 250-300 tons per hour capacity, complete with 4 large loading booms, shaker screens, vibrating screens, and all necessary appurtenances. Like new.
1—5-Track Jeffrey Steel Tipple with 4 large loading booms, shaker screens, screening plant, equipped with Nordberg mesh screens, capacity 230 tons per hour; 8' shaker screens, coal cleaner, Jeffrey 36 x 36 coal crusher, motors, and all necessary appurtenances.

Several other 3- and 4-track steel tipples suitable for strip, drift, slope or shaft mines.

LOADING MACHINES, 250 V DC

6—14-BU-3PE Joy
4—14-BU-7RBE Joy
8—11-BU Joy
6—8-BU Joy
10—7-BU Joy
2—Myers-Whaley No. 3 Automats, practically new.
5—460 Goodman
2—360 Goodman
4—260 Goodman
5—L-600 Jeffrey
3—L-500 Jeffrey

PERMISSIBLE TYPE, 250 V DC

6—Jeffrey 29-U rubber tire mounted
3—Jeffrey 29-U cat mounted
4—Jeffrey 29-U track mounted
2—Jeffrey 29-L rubber tire mounted
3—Goodman 324-AA rubber tire mounted
5—Goodman 324-AA track mounted
10—Jeffrey 35-BB
4—Jeffrey 35-BC
12—Sullivan 7-B
6—Goodman 512 on cats

AC CUTTING MACHINES, 220/440 V

2—Jeffrey 29-U
1—Jeffrey 24-B
3—Jeffrey 35-BB
1—Jeffrey 35-L
5—Goodman 12G3
5—Goodman 11G3
4—Goodman 11G3A
2—Goodman 11DG3A

ELECTRIC HOISTS

All types of Hoists from 100 HP to 1200 HP suitable for slope, shaft or drift mines.

STEEL MINE CARS

Several Lots of Rotary Dump, End Dump, and Drop Bottom Mine Cars for high and low vein mines. Mail us your inquiries. We have them in lots from 100 to 600; track gauges 38"-40"-42"-44".

ALL TYPES OF CABLE REEL SHUTTLE CARS, 250 V DC

WE SPECIALIZE IN BUYING OUTRIGHT COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

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"CERTIFIED REBUILT"

M-G SETS—AC to DC

500 KW G.E. syn. converter, DC 275 v.
300 KW Whse. DC 600 v., Synch. Motor, 2300 v.
300 KW Allis Ch. DC 250 v., motor, 2200 v.
200 KW Whse. DC 275 v., synch. motor, 2300 v.
150 KW Whse. DC 275 v., motor 2300 v.
200 KW G.E. DC 125 v., syn. motor 440 v.
100 KW G.E. DC 275 v., motor, 2300/4000 v.
75 KW Whse. DC 250 v., motor, 2200/440 v.
Large Stock Whse. & late model D.C. motors.
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28 SURPLUS NEW BELT CONVEYORS
36 INCH 1-160' — 2-250' — 1-320' — 1-400' — 1-590' — 2-1000' & 1-1600' Long.
42 INCH 1-144' — 1-290' — 1-377' — 1-575' — 2-700' — 1-880' — 2-1500' Long.
Extra Idlers — Terminals — Belts
STEEL STORAGE TANKS
26—8,000-10,000 & 20,000 Gal. Cap.
DARIEN, 60 E. 42nd St., N. Y. 17, N. Y.

LOCOMOTIVES

5—13 ton Jeffrey MH-110, 250 D.C. 42" Ga.
1—20 ton Jeffrey MH-110, 250 DC, 42" Ga.
3—8 ton Jeffrey MH-100 250 DC 42" ga.
6—6 ton Jeffrey MH-88
4—6 ton Mancha Battery Type 48 cell, C-61-6 mtrs 42" ga.
5—13 ton G.E. 42" ga.
20—6 ton Goodman, 42" ga.
3—8 ton Goodman, 42" ga.
3—15 ton Westinghouse, 42" ga.
8—5 ton GE Battery, 36" ga. (with batteries)
3—5 ton Mancha Battery, 36" (with batteries)
2—12 ton Jeffrey, 42" ga.
2—12 ton GE, 42"
6—6 ton GE Battery, 42"
2—12 ton Goodman, 42" ga.

LOADING MACHINES

23—Joy Loaders, 250 DC, 42" ga. 7 & 8 BU
2—Joy Continuous Miners, 250 DC

CUTTING MACHINES

10—Goodman Shortwall Cutting Machines

COAL DRILLS

17—Chgo-Pneu. post mtd'd coal drills, AC & DC
50—Type 473 Dooley Bros. Elec. Coal Drills

MINE & SHUTTLE CARS

150—4 ton steel mine cars, 42" ga. 'E dump
25—Joy shuttle cars, 42D
200—3 ton 42" ga. ACF Mine cars, Timken
200—2½ ton ditto '
10—Charging panels for shuttle car batteries

GENERATORS

1—2000 KVA Westinghouse 2400 V generator, comp.
1—1500 KW Allis Chalmers 2400 V Generator, comp.
1—700 KVA GE
3—150 KW Westinghouse MG set 2300 V.
1—300 KW GE
1—75 Westinghouse MG set

CONVEYORS

1—36" BA Conveyor with 150 HP drive, 2000'
6—Joy Elev. conveyors, type PL-11-2E

CAR SHAKEOUT & HOISTS

1—8 ton heavy duty L.B. car shakeout with 6 ton elec. hoist for 220/440
1—Hewitt-Robbins heavy duty Shakeout A.C.

TIPPLE

1—6 track tipple comp. with shaker & boom

MINE AND SLOPE HOISTS

3—12000# Wellman Sgl Drum 4'x3' F hoists with 150 HP motors, starters, safety control, 250 V DC
1—10000# Clyde DC
1—20,000# Nordberg Sgl Drum
1—11,000# Wellman Sgl Drum AC
1— 7,000# Ottumwa Sgl Drum AC

CARPULLERS AND LOADERS

1—10,000# Link Belt Capstan Carspotter new
1— 5,000# Jeffrey Carspotter AC
1— 5,000# Link Belt Carspotter AC
1—20,000# Amer. Hoist Carspotter AC
1—20,000 LB Endless puller

CRUSHERS AND MISC.

1—36x36 Jeffrey Sgl Roll
1—12x16 Eagle Dbl Roll
1—18x20 Eagle Dbl Roll
1—420" x 20" BA Comb. Scraper & Bucket Conveyor or w/o Mtr. ideal for tipple or dock.
3—24"x60' BA Portn. conveyors AC motor
1—(New) Nolan Porta-Feeder
4—Joy Caterpillar T-1E Mining Machine Trucks

HAWKINS & CO.
154 S. Michigan Ave., Chicago 3, Ill.
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SUPERIOR DIESEL GENERATOR SETS
100 KW

30 sets available. ENGINE: 8 cylinder, 150 H.P.—5½ x 7. GENERATOR: 120/240 volts D.C., 417 amps., stabilized shunt, electric starting.

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Baltimore 2, Md.
Curtis 5050

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CELAB RECTIFIER
250 K.W. 275 V.

ALL NEW SELENIUM STACKS AND A.C. BREAKER

Same As New
Immediate Delivery

CLARK ELECTRONIC CORP.
PALM SPRINGS, CALIF.

FOR SALE

3—Model 4500 Manitowoc Draglines, caterpillar-mounted, with 140 booms, buckets, Caterpillar engines, 5 cu. yd. 100-ton capacity, one and two years old.

1—Model 3500 Manitowoc Speedcrane, Liftcrane, clamshell, dragline combination, 2½ cu. yd. 60-ton capacity, new October, 1950.

1—Model 803 Koehring Liftcrane, Clamshell, Dragline combination, 2 cu. yd. 50-ton capacity.

All located in Florida. Reply to

Clemens Construction Company
P. O. Box 266, West New York, N. J.

1—5 Track Jeffrey Tipple, Wood Structure, loads 6 grades, complete with primary shaker screens, two vibrators, loading booms, 2 Belknap Chloride Washers and Viking Oil Treating System, now in operation.

1—McNally-Norton 60" Type B Special Pick Breaker with 20 H.P. Motor, 440 Volts, A.C.

1—Barber Greene Conveyor Model #61-A with 10 H.P., Gasoline Motor.

Crystal Block Coal & Coke Co.
Rawl, West Virginia

FOR SALE
WIRE ROPE

2—1,250 Ft. Pcs. 1-⅝" Reebling Locked Smooth Coil Track Strand Wire Rope for Aerial Tramway. NEW—NEVER USED. Apply to THE SNAP CREEK COAL COMPANY, P.O. Box No. 1029, or Tel. 1533, Logan, West Virginia.

VARIABLE SPEED DRIVES
FREQUENCY CHANGERS
LOW-VOLTAGE GENERATORS
American ELECTRIC CORPORATION
DEPT. P, Box 133, INDIANAPOLIS, IND.

FOR SALE

MOTOR GENERATOR SETS

1—500 KW G.E. Syn. MG Set, 2300 V AC, 500 V DC, 900 rpm, complete with switchboard.

1—500 KW West. Syn. MG Set, 2300 V AC, 275 V DC, 1200 rpm, complete with switchboard.

1—200KW Ridgeway Syn. MG Set, 2300 V AC, 275 V DC, 900 rpm, complete with switchboard.

1—150 KW G.E. Syn. MG Set, 2300 V AC, 275 V DC, 1200 rpm, complete with switchboard.

1—100 KW G.E. Syn. MG Set, 2300 V AC, 275 V DC, 1200 rpm, complete with switchboard.

1—100 KW West. Syn. MG Set, 2300 V AC, 275 V DC, 900 rpm, complete with switchboard.

1—100 KW Ridgeway Syn. MG Set, 2300 V AC, 275 V DC, 1200 rpm, complete with switchboard.

1—50 KW Allis Chalmers MG Set, 2300 V AC, 275 V DC, 900 rpm, complete with switchboard.

ROTARY CONVERTERS

2—200 KW G.E. Syn. rotary converters, type HCC-6, 275 V, 1200 rpm, 2300/4000 V AC, complete with automatic switchboard.

MINING MACHINES

1—Joy 10RU Coal Cutter, 250 V DC, (brand new).

2—7B Sullivan shortwall mining machines, complete with bug dusters and Joy T1 trucks.

2—512 Goodman DC shortwall mining machines, complete with bug dusters, hydraulic controls, 8½' cutter bars, mounted on Joy T1 cat trucks, (like new).

3—512 Goodman AC shortwall mining machines, 3/60/220/440, complete with Joy T1 cat trucks.

3—Sullivan CLE5 longwall mining machines, 3/60/220, with 4½' cutter bars.

2—Jeffrey 35BB shortwall mining machines, with 7½' cutter bars, complete with trucks.

4—Jeffrey 29U, 250 V DC, 48" gauge, cutting machines with 9' cutter bars.

CRUSHERS

1—36 x 36 Jeffrey single roll crusher.

1—24 x 48 McNally Pittsburgh double roll crusher.

1—30 x 36 United Iron Works single roll crusher.

1—24 x 24 Hercules single roll crusher.

1—24 x 24 Webster single roll crusher.

1—24 x 24 Stevens Adamson single roll crusher.

1—48" McNally Pittsburgh vertical pick breaker.

2—American Pulverizer Company ring roll crushers.

1—Pennsylvania Crusher Company size 7 x 11 Bradford Breaker, (like new).

LOCOMOTIVES
(Ball Bearing)

MAKE	TYPE	GAUGE
1—20 ton Goodman	36-AO4T	42"
1—15 ton Jeffrey	MH 110	42"
2—15 ton Jeffrey	MH 77	36"
2—13 ton Jeffrey	MH 110	36"
2—13 ton Jeffrey	MB Class 26E	42"
1—10 ton Jeffrey	MH 110	42"
3— 8 ton Goodman	32-AO4T	36"
1— 8 ton Goodman	32-AO4T	42"
1— 8 ton Westinghouse	4-2-35-C-437	36"
5— 6 ton G.E.	HM 821A	42"
1— 6 ton G.E.	HM 703B	42"
1— 6 ton Jeffrey	MH 64	42"
1— 4 ton Goodman	42-I-4-T	36"

LOADERS

5—8 BU DC Joy Loaders.

2—11 BU DC Joy Loaders.

5—14 BU DC Joy Loaders, (one brand new—never used).

2—7 BU AC Joy Loaders.

1—260A DC Goodman Loaders.

2—360A DC Goodman Loaders.

2—L 400 DC Jeffrey Loaders.

SHUTTLE CARS

6—42E Joy cable reel type shuttle buggies.

2—32E Joy cable type shuttle buggies.

2—5SC Joy cable type shuttle buggies.

2—10SC Joy cable reel type shuttle buggies, (brand new).

2—42E battery type shuttle buggies.

We also carry a complete line of conveyors of all sizes; together with hoists, from 20 H.P. through 1300 H.P. capacity; electric motors, both AC and DC; transformers of all sizes and types; speed reducers; belt drives; tipples and washers of all sizes and capacities; copper wire, both bare and insulated, from 600 volts through 5000 volts, including trolley wire and all types of trolley accessories; and other items too numerous to mention.

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New Troughing Idler Conveyors

We will take our loss on our stock of short length belting and previous model idlers and return rollers in made up conveyors. You can save as much as 50% by buying the BONDED CONVEYOR SPECIALS listed below and accepting your conveyor belting in two pieces. These idlers, belting and conveyor sections are all new. Be dollar wise and take advantage of this saving.

Quantity	Belt Width	Length of Conveyor	List Price	Sale Price
1	24"	25'	$1322	$ 657
1	24"	45'	2062	1085
1	24"	100'	4097	2037
1	30"	25'	1421	806
1	30"	65'	3101	1583
1	30"	125'	5621	2748
1	36"	40'	2182	1222
1	36"	75'	3757	2033
1	36"	105'	5107	2616
1	48"	40'	2609	1426

Note: All belting is 4 ply, 28 oz. duck belt with ⅛" top rubber cover and 1/32" bottom cover.

Other Bonded Bargains:

Crushers:
12x16, 19x20, 28x24 Double Roll
19x20 and 19x40 Single Roll

Motor Truck Scales:
25 ton to 50 ton capacities

Feeders: 24" to 48" wide

Vibrating Screens:
2x4, 3x6, 3x8, 4x10, 4x12, 5x14

Conveyor Belting:
Famous brands at deep cut prices.

Width	Ply	Top Cover	Bottom Cover	Duck Carcass	Price
18"	4	⅛"	1/32"	28 oz.	2.50/ft.
24"	4	⅛"	1/32"	28 oz.	3.23/ft.
30"	4	⅛"	1/32"	28 oz.	3.97/ft.
36"	4	⅛"	1/32"	28 oz.	4.70/ft.
48"	4	⅛"	1/32"	28 oz.	6.16/ft.

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300 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
300 KW Ridg. 275 v. 1200R-Syn. 2300 v.
300 KW West. 550 v., 1200R-Syn.-SK 2300 v.
200 KW West. 275 v. 1200R-SK-CW 2300 v.
200 KW G.E. 275 v. 1200-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
200 KW West. 275 v. 900 R. SK-Syn. 2300 v.
200 KW G.E. 125 v. 1200 R MPC-ATI 2300/4000 v.
150 KW G.E. 275 v. 1200 R. MPC-ATI 2300/4000 v.
150 KW West. 275 v. 1200R-Syn.-SK 2300 v.
150 KW G.E. 550 v. 900 vR-DLC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
35 KW G.E. 125 v. 1750 R. RC-KT 220/440 v.
15 KW Ideal 125 v. 1750R. D-A 220/440 v.

LOCOMOTIVES AND CUTTING MACHINES

20 Ton Jeff 250 v. 44" Ga. MH77
13 Ton Jeff 250 v. 38/48" Ga. MH110
10 Ton Jeff 250 v. 36/48" MH110
8 Ton Goodman 250/550 v. 42"/44" ga.
6/7 Ton Jeffrey Battery 42" ga.
6 Ton Westgh. 250 v. 36" Ga. 904
2—6 Ton G.E. 250 v. 28½" ga.
4—5 Ton Goodman 30B 250 v. 42/44"
35 B Jeff. 250 v. Permissible
35 BB Jeff. A.C. permissible
3—12A Goodman Shortwall 50HP Motor 250 v.

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2—500 KW G.E. 275 v. HCC6-1200R. 13,200 v.
600 KW West 275 v. 1200R, 13,860/2200/4000
300 KW G.E. 275 v. HCC6-1200R, 2300/4000 v.
300 KW G.E. 275 V. HC12-600 R, 2200/4000
200 KW G.E. 275 v. HCC6-1200R, 2200/4000 v.
150 KW G.E. 275 v. HCC6-1200R, 2200/4000 v.
Will rewind transformers to your specifications.

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HP	MAKE	SPEED	TYPE	WDG.
400	G.E.	450	IM	S.R.
300	G.E.	450	MT	S.R.
150	G.E.	600	ATI	Syn.
2—150	G.E.	450	IM	S.R.
100	West.	900		Syn.
100	West.	1200	CS	S.C.
75	West.	900	CS	S.C.
50	G.E.	1750	KT	S.C.
50	G.E.	900	KT	S.C.
40	G.E.	900	MT	S.R.
30	G.E.	900	KT	S.C.
30	G.E.	1200	KT	S.C.
20	West.	1200	CS	S.C.
15	West.	1750	CS	S.C.

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2—G. E. Transformers #1797341 Type H Form K, 60 cyc. 25 KVA.
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9,000 F-11H Bits for Cincinnati Cutter Chain
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1 Joy low pedestal 14 BU Loader.
1 Joy 8 BU Loader, 33½" high, rebuilt.
1 Jeffrey 61 CLR Loader, rebuilt.
2 Myers Whaley No. 3 Automat Loaders.
2 Joy cable reel Shuttle Cars, rebuilt.
1 Joy T-2 low pan Cat Truck, like new.
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12 Jeffrey MH-88, 6 ton Locomotives, 3 pr. in tandem.
(large stock of parts and supplies for above)
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6 Goodman 6 ton, armor plate frames.
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80 End Dump, 48" Ga. 30" above rail.
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MOTORS GENERATORS TRANSFORMERS
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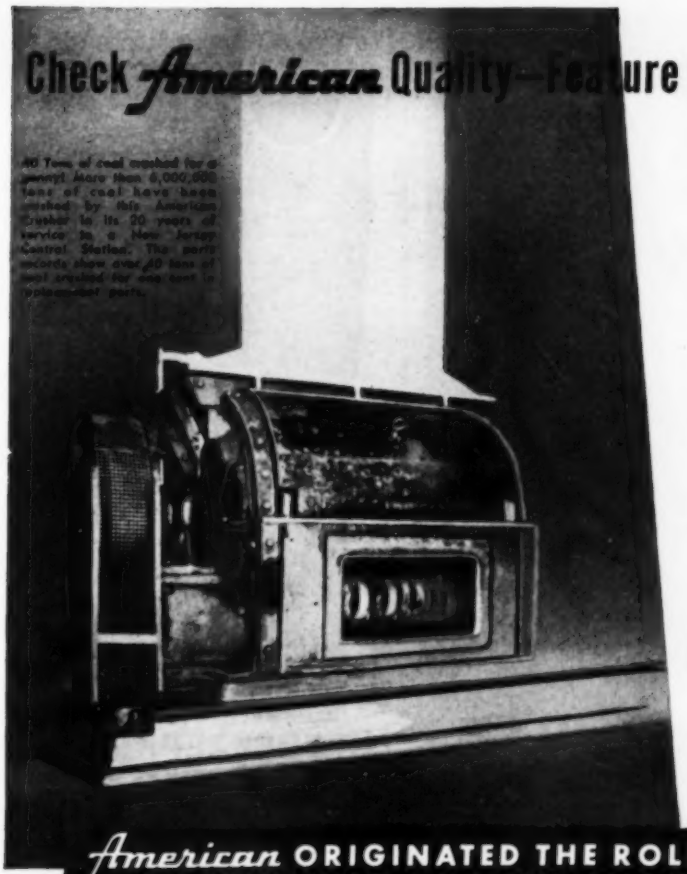

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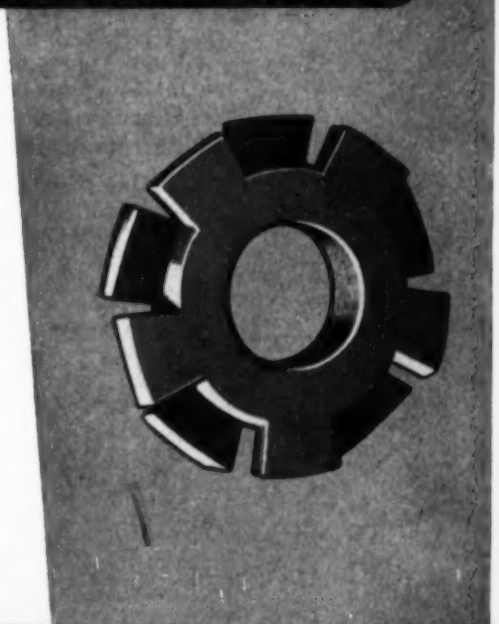

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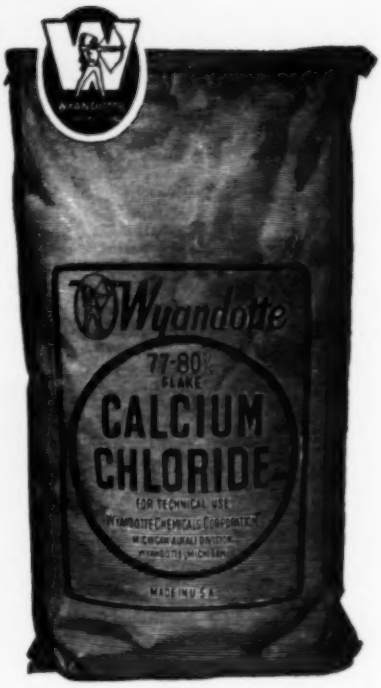

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KEYSTONE COAL BUYERS MANUAL

1952 Edition

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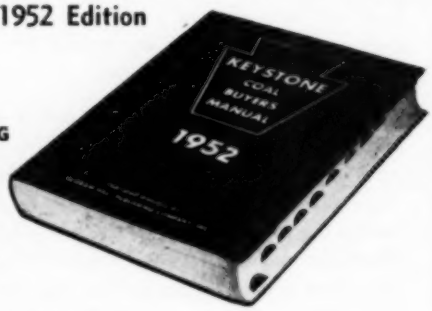

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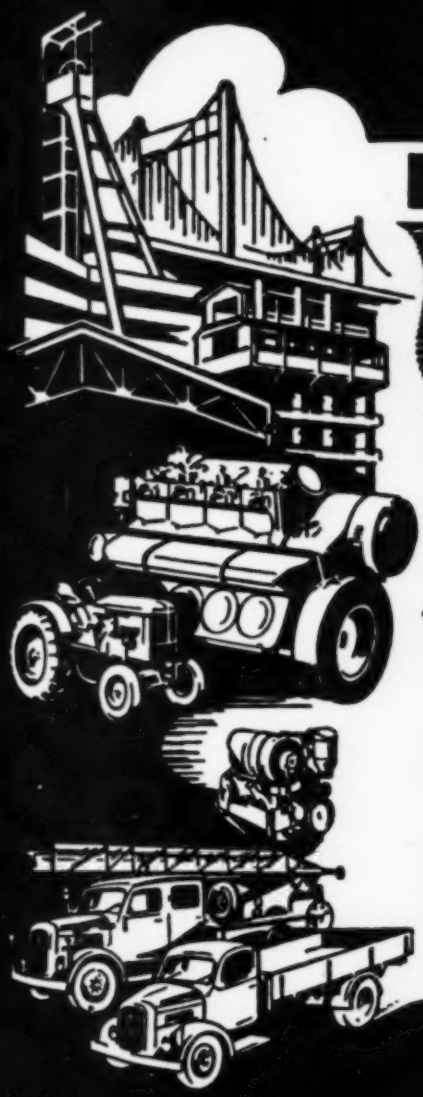

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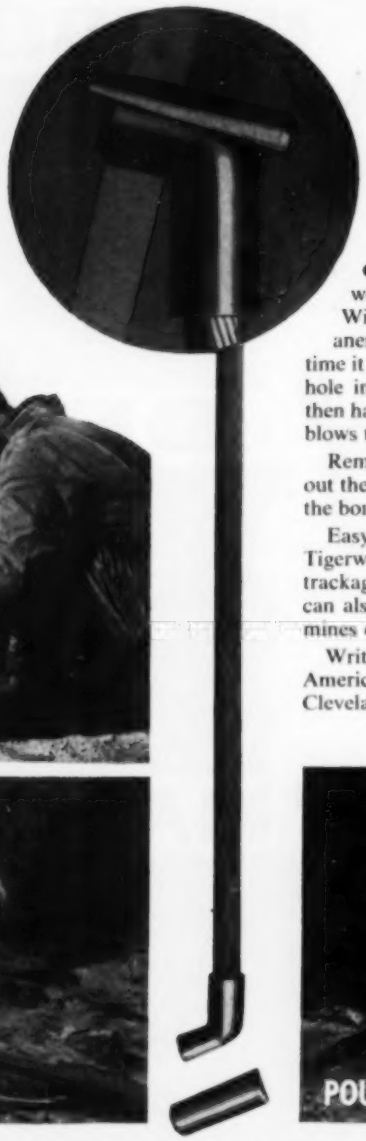
Three hammer blows secure this Wedge-Type Tigerweld bond



• It's easy to install the Wedge-Type Tigerweld bond because you don't have to weld it. With a drill and a hammer you get a permanent, low-resistance joint in a fraction of the time it takes to make one weld. All you do is drill a hole in the track, insert the terminal and wedge, then hammer in the wedge. It takes only three sharp blows to finish the job.

Removing this bond is easy too—just hammer out the wedge. You don't damage the terminals; so the bond can be used over and over again.

Easy installation and removal make Wedge-Type Tigerweld bonds the first choice for temporary trackage that must be moved and relaid. And you can also use them for permanent trackage—many mines do.

Write today for more information. Address American Steel and Wire, Rockefeller Building, Cleveland 13, Ohio.

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U·S·S American Tigerweld Rail Bonds

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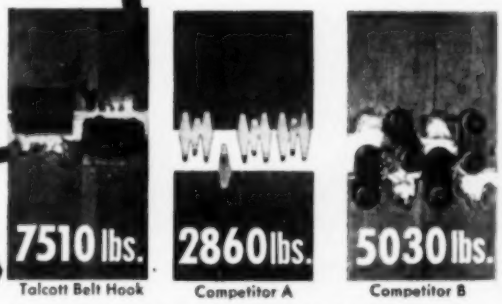

BREAKING STRAIN

7510 lbs.	2860 lbs.	5030 lbs.
Talcott Belt Hook	Competitor A	Competitor B

At our expense convince yourself with this *free test:* On any individual surface conveyor belt, make a joint with Talcott Fasteners. Work it hard — then figure your savings through longer belt life without breakdowns, due to our fasteners' close pliable joint that sets records for break-resistance. Finally, multiply proved savings on this test by your total number of belts in use — and you'll have good reason to send us your order for a complete Talcott Fastener installation. Fair enough?

Send for Free Samples

Without obligation, write for free samples of Talcott Fasteners for testing. State kind of belting (leather or rubber? transmission or conveyor?), width, thickness or number of plies, extra covers or not, diameter of smallest pulley. Ask about Talcott Fasteners for patching, too.

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Eliminate 70% to 90% of Conveyor Downtime

EVERYTHING is contained INSIDE the pulley shell!

HERE'S a money-saving departure from conventional conveyor drives. A Cedarapids-Schrock *Motorized* Head Pulley is simply a new application of the long-proven gear reduction drive, with everything . . . electric motor, reduction gears and all moving parts . . . contained inside the drum, completely protected from grit, dirt and weather and with no outside parts or motors to service. 70% to 90% of conveyor trouble and downtime is saved by eliminating the exposed parts necessary with conventional pulley drives. In operation, the pulley shell rotates about the electric motor which is held stationary by a torque arm attached to the conveyor frame. The speed of the shell depends on the combined reduction ratio of the pinions and gears inside the shell. Compact, easy-to-install, job-proved Motorized Head Pulleys are available in sizes from 5 to 30 HP and in various widths.

Find out all the advantages of converting your belt conveyor or belt-bucket elevator installations to *motorized* efficiency before you need head pulley replacements. See your distributor today, or write for Bulletin MP-1.

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The 30' x 40' Neff & Fry Silo, at the Burton Mine of Richwood-Sewell Coal Co., has a storage capacity of 707 tons. Coal from the mine mouth enters the top of the silo, then is drawn out the bottom for the grading and preparation machines. Plate feeder conveyors are used. The silo serves as a reservoir to take care of fluctuations between production and processing.

This installation is typical of many we have made at coal mines, although the details of moving the coal are especially worked out between the conveyor manufacturers and ourselves to meet each particular situation.

If you're interested, we'll be glad to send you preliminary information looking toward a survey of your requirements.

THE NEFF & FRY CO. • 228 Elm St. • Camden, Ohio

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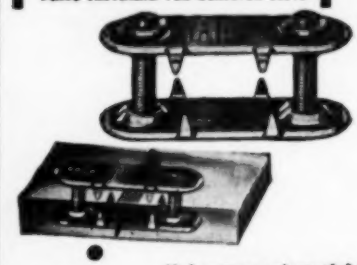
PLATE FASTENERS FOR CONVEYOR BELTS



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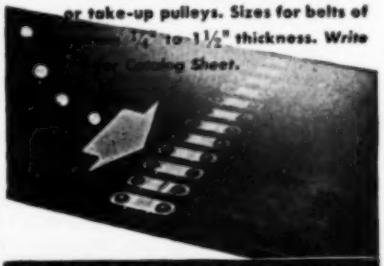

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Each month, full-page messages like the one shown below—featuring either "off-track" or "on-track" installations—appear in the pages of *Business Week, Nation's Business* and a carefully selected group of power journals and trade magazines.

For LOW-COST DEPENDABLE steam, UPJOHN burns COAL the modern way!

The firing aisle of Upjohn's ultramodern steam plant. This plant supplies steam, cleanly and efficiently, at only 40c to 42c per 1,000 lbs. for the Portage Road Plant near Kalamazoo, Michigan. There are no dust or smoke nuisances, thanks to the dust-collecting and cinder re-injection system. Ash handling is fully automatic. These 3 boilers, plus a fourth recently installed (not illustrated), deliver up to 115,000 lbs. steam per hour at peak load.

Whether you're building a new plant or modernizing an older one, you can count on coal for dependability and low-cost operation.

Here's why: Up-to-date coal-burning equipment can give you 10% to 40% more steam per dollar. Automatic coal- and ash-handling systems can cut your labor cost to a minimum. Let a consulting engineer show you how a modern coal installation, tailored for your specific needs, can save you real money.

Here's something else, too—of all fuels, coal alone has virtually inexhaustible resources. This, plus the fact that America's highly mechanized coal industry is the most efficient in the world, assures you of a dependable supply of coal at relatively stable prices now and for years to come.

If you operate a steam plant, you can't afford to ignore these facts!

COAL in most places is today's lowest-cost fuel.

COAL resources in America are adequate for all needs—for hundreds of years to come.

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal set even bigger savings.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association, Washington, D. C.

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CUT COSTS OVER 60%

Pressure-Creosoted Oak Ties Used in a Coal Mine's Main Hauiageway.

● With today's high-speed, heavy-tonnage haulage, there's no place for *bad* ties. They represent a serious hazard. And frequent replacements run into too much money.

Koppers Pressure-Creosoted Timber Ties are protected against decay. They *retain* their strength. Because of their exceptionally long life, they effect substantial savings.

For example, 3,809 sawed southern pine ties, each impregnated with creosote, were installed in a location where *untreated* ties had lasted, on the average, only 4 years. It was estimated that the *treated* ties would last 20 years; on this theoretical basis, the cost per year would be cut by more than 62%, and the net savings for the installation would be about $12,000.

After 21 years' hard service, this haulageway was inspected, and its performance reviewed. *The anticipated savings had been fully realized!* Moreover, more than 97% of the ties were still serviceable; therefore, the eventual savings will be even greater.

In many other places, Koppers Pressure-Treated Wood can save money for mine operators. For full information, send for our free book, "10 Proven Ways to Cut Mining Costs." Mail in the handy coupon, and this helpful book will be on its way to you.

KOPPERS COMPANY, INC., Pittsburgh 19, Pa.

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FOR MORE EFFICIENT LOADING UNDER ALL MINING CONDITIONS

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THE 400-U ROOM AND UTILITY CONVEYOR

Maximum Length ..... 300 feet
Capacity ..... to 90 Tons Per Hour
Conveyor Width ..... 12 inches

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Capacity ..... to 180 Tons Per Hour
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THE 400-WT HIGH CAPACITY GATHERING CONVEYOR

Maximum Length ..... 500 feet
Capacity ..... to 270 Tons Per Hour
Conveyor Width ..... 15 inches

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In addition to a complete line of underground conveyors, LONG has recently developed a series of outside conveyors in the 300 Tons Per Hour class. These include conveyors for incline and decline applications, tipple work, loading booms, stock piling, elevating, etc.

ONLY **LONG** CONVEYORS OFFER THESE "CONTINUOUS FLOW" FEATURES

- Superflite Chain
- "Whispering Joint" Pans
- Gravity Takeup Head Section
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Write for Details or Demonstration

LONG SUPER MINE CAR CO., INC.
OAK HILL, W. VA.

WILFLEY
centrifugal PUMPS

30 acres 2 miles

Wilfley Special High Head Pumps in operation at the Puunene Mill of the Hawaiian Commercial & Sugar Co.

- ***Wilfley Special High Head Sand Pumps*** play an important role in the successful reclamation program of the Hawaiian Commercial & Sugar Co.
- Each year, at the Puunene Mill, 30 to 40 acres of useless, sandy waste land are transformed into productive ground for sugar cane cultivation.
- Soil, removed from mechanically harvested cane by washers, is settled to a sludge of 15% to 25% solids. This sludge, together with a sludge of repulped filter cake, is pumped to the diked waste area. When dry, there remains a 2 to 3-ft. layer of reclaimed cultivable topsoil over the coral sands.
- WILFLEY Pumps, operating on a 24 hour-a-day, trouble-free schedule perform the tremendous task of delivering 300- 500 G.P.M. of cane washer wastes through 2 miles of 6" pipeline to the reclamation area. As a result, wastes which formerly presented a costly disposal problem, are now converted into revenue-producing land.

Buy rugged, heavy-duty Wilfley Pumps whenever the job calls for the efficient and economical handling of sludges, slimes, slurries or sands. The new WILFLEY Model "K" Centrifugal Sand Pump, embodying many important mechanical improvements, delivers higher efficiencies, stepped-up production, worthwhile power savings and lower operating costs. Easy interchangeability of wear parts. Low maintenance costs. Every application individually engineered. Write or wire for complete details.

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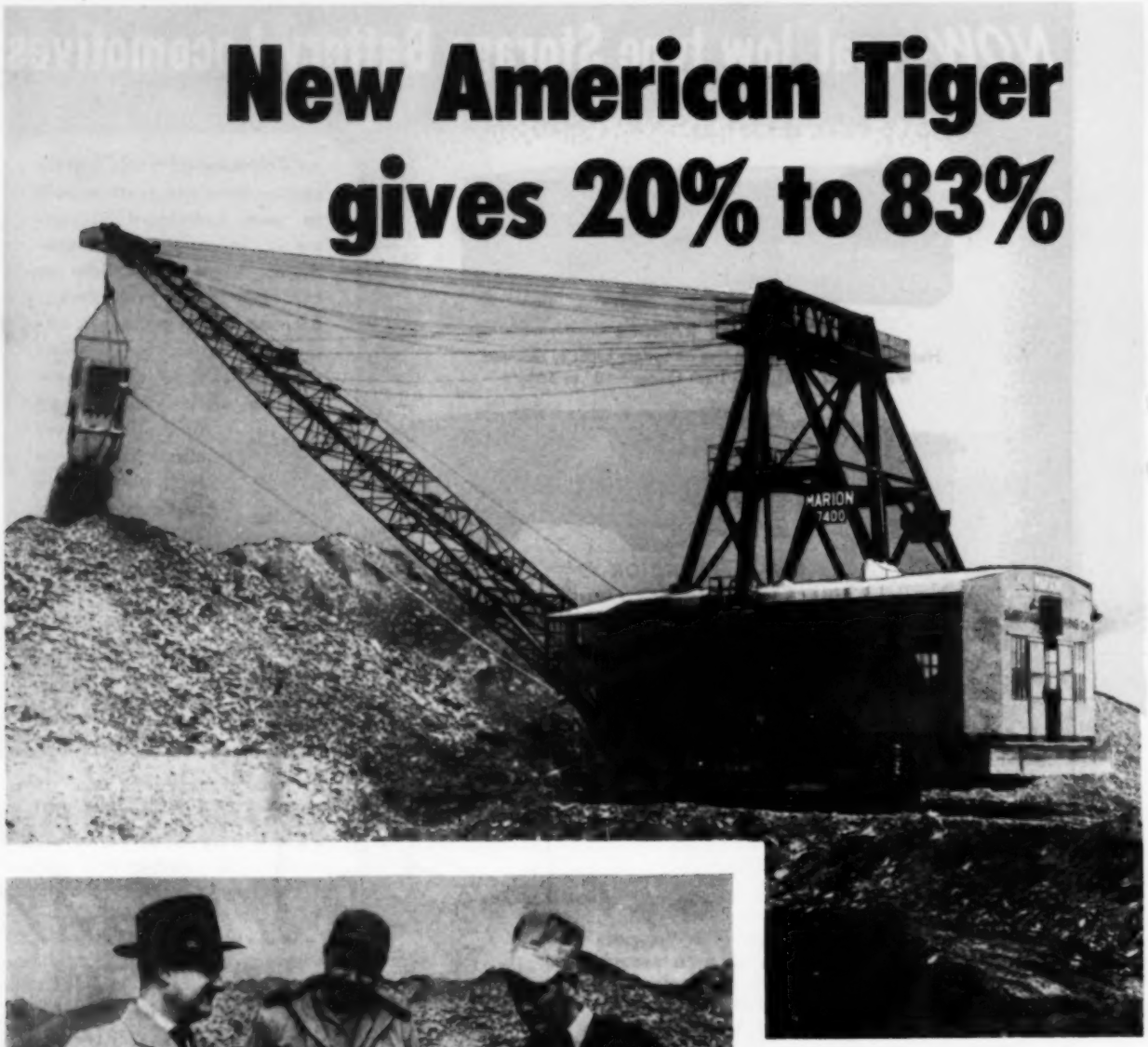
New American Tiger gives 20% to 83%



20% INCREASE IN WIRE ROPE LIFE. When this 14 cu. yd. drag line was equipped with the new Tiger Brand 2¼" Drag Line, the average service life of the rope was increased 20% over other brands tested.

SAVES MONEY AND TIME—INCREASES PRODUCTION. This new Tiger Brand Drag Line Rope quickly pays for itself through increased life and greater production. Try it next time you have to replace your drag rope.

USS
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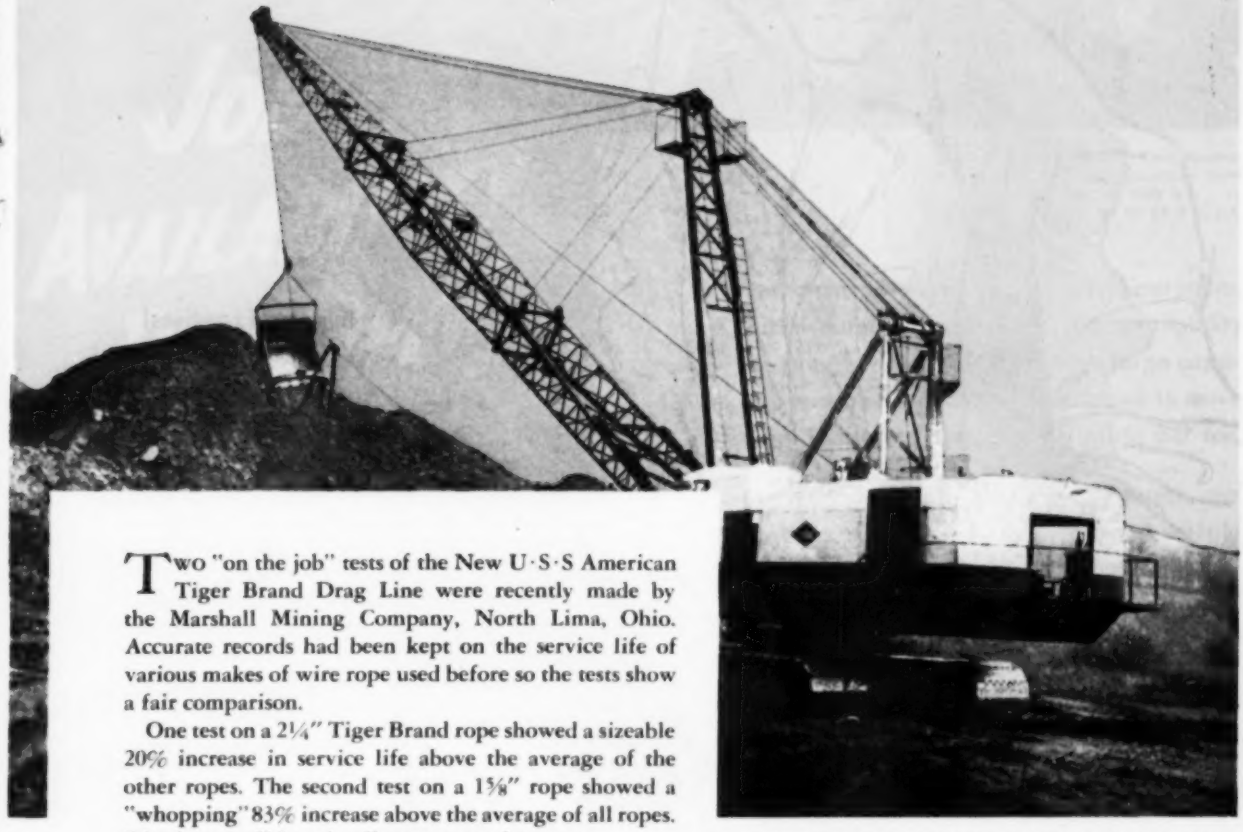
WIRE ROPE
UNITED STATES STEEL

Brand Drag Line increase in service life



Two "on the job" tests of the New U·S·S American Tiger Brand Drag Line were recently made by the Marshall Mining Company, North Lima, Ohio. Accurate records had been kept on the service life of various makes of wire rope used before so the tests show a fair comparison.

One test on a 2¼" Tiger Brand rope showed a sizeable 20% increase in service life above the average of the other ropes. The second test on a 1⅝" rope showed a "whopping" 83% increase above the average of all ropes. Digging conditions in all cases were the same.

This new Tiger Brand Drag Line was designed especially to resist the severe operating conditions imposed by this class of service.

The use of this new rope on your drag line will mean substantial savings in your wire rope costs. It will cut your down time and help to keep machines at top capacity.

DRAG LINE LIFE INCREASED FROM 600 HOURS TO 1100 HOURS—83%. The best service on this drag line using 1⅝" rope averaged 600 hours for other brands of rope. But with the new U·S·S Tiger Brand Rope, service life jumped to 1100 hours—almost double the previous average.

U·S·S AMERICAN TIGER BRAND WIRE ROPE

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Excellay Preformed

UNITED STATES STEEL

"she might have been my kid..."

"There was no time to stop, see? She comes running out from behind this parked car right under my wheels. Her hair is in pigtails, and with the sun shining on it, she might have been *my* kid. We got her to the hospital. It took 3 pints of blood to bring her around. All I have to do is remember the sound of those screaming tires—and I know why *I'm* giving blood."

Yes, all kinds of people give blood—truck drivers, office workers, salesmen. And—for all kinds of reasons. But whatever *your* reason, this you can be sure of: Whether your blood goes to a local hospital, a combat area or for Civil Defense needs—this priceless, painless gift will some day save an American life!

Business Executives!

✓Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed your employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a *single* pint of blood may mean the difference between life and death for *any* American . . . the need for blood is *urgent!*

Give Blood Now

CALL YOUR RED CROSS TODAY!

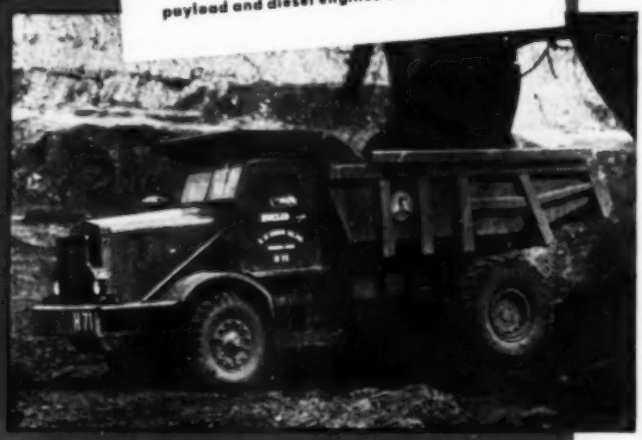
NATIONAL BLOOD PROGRAM

IN MINES and QUARRIES

JOB AVAILABILITY PAYS OFF!

Euclid Bottom-Dump Coal Haulers of 20 to 40 ton capacities have diesel engines to 300 h.p. . . . loaded speeds up to 34.4 m.p.h.

Rear-Dump Euclids of 10 to 34 ton capacity have travel speeds to 36.3 m.p.h. with full payload and diesel engines of 125 to 400 h.p.



For open pit mining and quarry operations, Euclids are unmatched for job availability and long service life. "Eucs" have large capacity and plenty of power and speed to move more loads per hour at more profit per ton.

Bottom-Dump Euclids are engineered and built as complete units with good weight distribution, and tremendous power. Short wheelbase of the tractor and the universal hitch design make them easy to handle and permit short turns in narrow cuts.

Rear-Dump "Eucs" have body designs for all types of materials—coal, ore, rock, overburden and other heavy excavation. Their rugged construction withstands the impacts of loading heavy materials and travel on rough roads—assures low operating and maintenance costs.

Put Euclids on the job and be on more jobs! Ask your Euclid Distributor for information on the models best suited to your off-the-highway hauling requirements.

The EUCLID ROAD MACHINERY Co.
Cleveland 17, Ohio

EUCLIDS *Move the Earth*

CONSISTENT QUALITY

that protects better under all conditions

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BRATTICE CLOTH

Get this easier handling, longer wearing cloth. Won't flame. In two weights, 36" to 96" wide.

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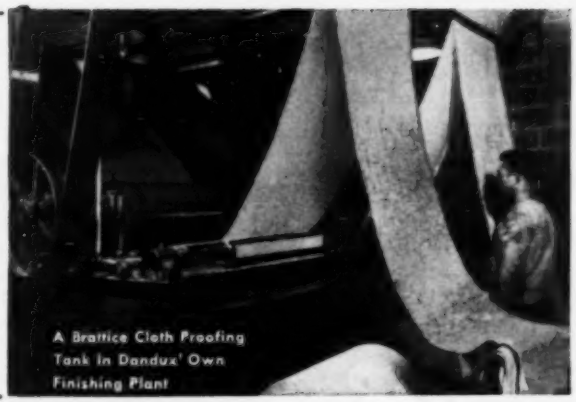

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. . . Here is GUARANTEED MAGNETIC PROTECTION for INDUSTRIAL and PROCESSING USES!

MAGNETIC PLATES—Std. widths 4" to 26"; Lengths and number of poles as required. Specials on order.

MAGNETIC PULLEYS—Std. diameters 12" to 30"; Belt widths from 4" to 60". Larger sizes on order.

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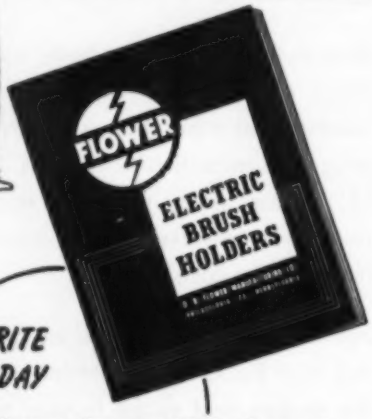

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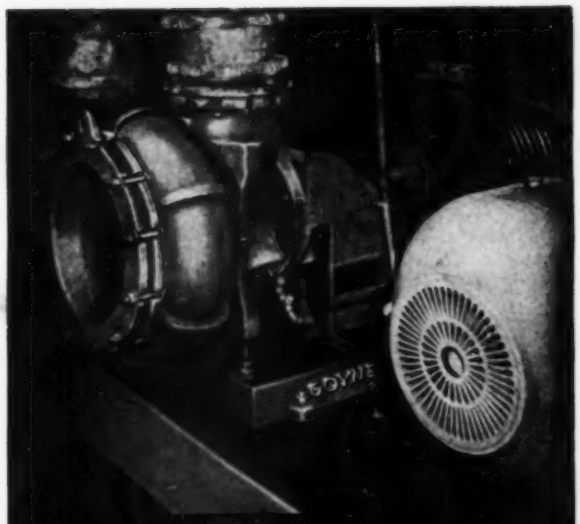

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SOLIDS HANDLING PUMP

Feature: LOW-COST OPERATION

GOYNE SOLIDS HANDLING PUMPS are extremely popular with a very large number of coal companies who find them quite reliable for pumping:

Liquids with solids added to increase specific gravities for coal and refuse separation in coal preparation plants.

Disposing of refuse and silt by pumping to waste material banks or for back filling into mined out areas.

Pumping prepared coal to temporarily desired storage areas.

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2. The only packing box of the pump is subjected to the low suction pressure rather than to the discharge pressure developed by the pump. This feature assures long packing and shaft sleeve life.

3. Impeller clearance is adjusted while the pump is running, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. Spare parts are carried in stock at our plant for prompt shipment. Reduce your inventory by using Goyne Process Pumps.

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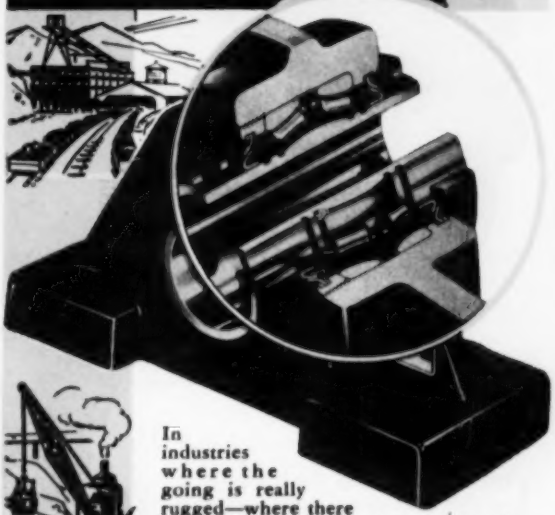

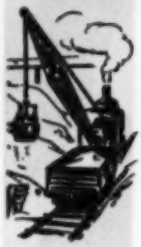

In industries where the going is really rugged—where there can be no uncertainty about bearing dependability, Shafer ConCaVex Bearings get the call. In fact, Shafer Bearings have faithfully served practically every heavy industry for over 3 decades. Add up these advantages and you'll see why:

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SHAFER BEARING CORPORATION
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163,125 tons of wet coal

over these Stainless Steel screens

—and they're ready for still more service!

THE LOWER DECK of this desanding and dewatering screen at the Pennsylvania Coal and Coke Corporation's Ehrenfeld plant is made up of 16 Stainless Steel screens. The inset shows one of the screens, all of which have been in service nearly a year.

THE 16 screens on the lower deck of this desanding and dewatering unit at the Ehrenfeld preparation plant of Pennsylvania Coal and Coke Corporation have handled 163,125 tons of wet coal in nearly a year of service. They're made of U·S·S Stainless Steel.

The long life to date—twice the service expected from ordinary screens—is outstanding in itself. But the screens are still in good condition, and preparation plant officials expect another six months to a year of wear.

The screens—36" x 32½"—are 16-gage plate with 3/16" round holes. They handle 45 tons per hour and are in service 72½ hours each week. To equalize wear, their positions are reversed every three months.

This is the kind of performance you can expect from Stainless Steel screens—and from the many other applications of Stainless in the preparation plant. Although its original cost is higher than other materials you can use, its long service life and freedom from maintenance make it cost you far less in the long run.

Get the full story of how one big preparation plant has made extensive savings with Stainless Steel by writing for our book, "Stainless Steel at Sunnyhill." Send your request to United States Steel Corporation, Room 2809-Z, 525 William Penn Place, Pittsburgh 30, Pa.

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3-481

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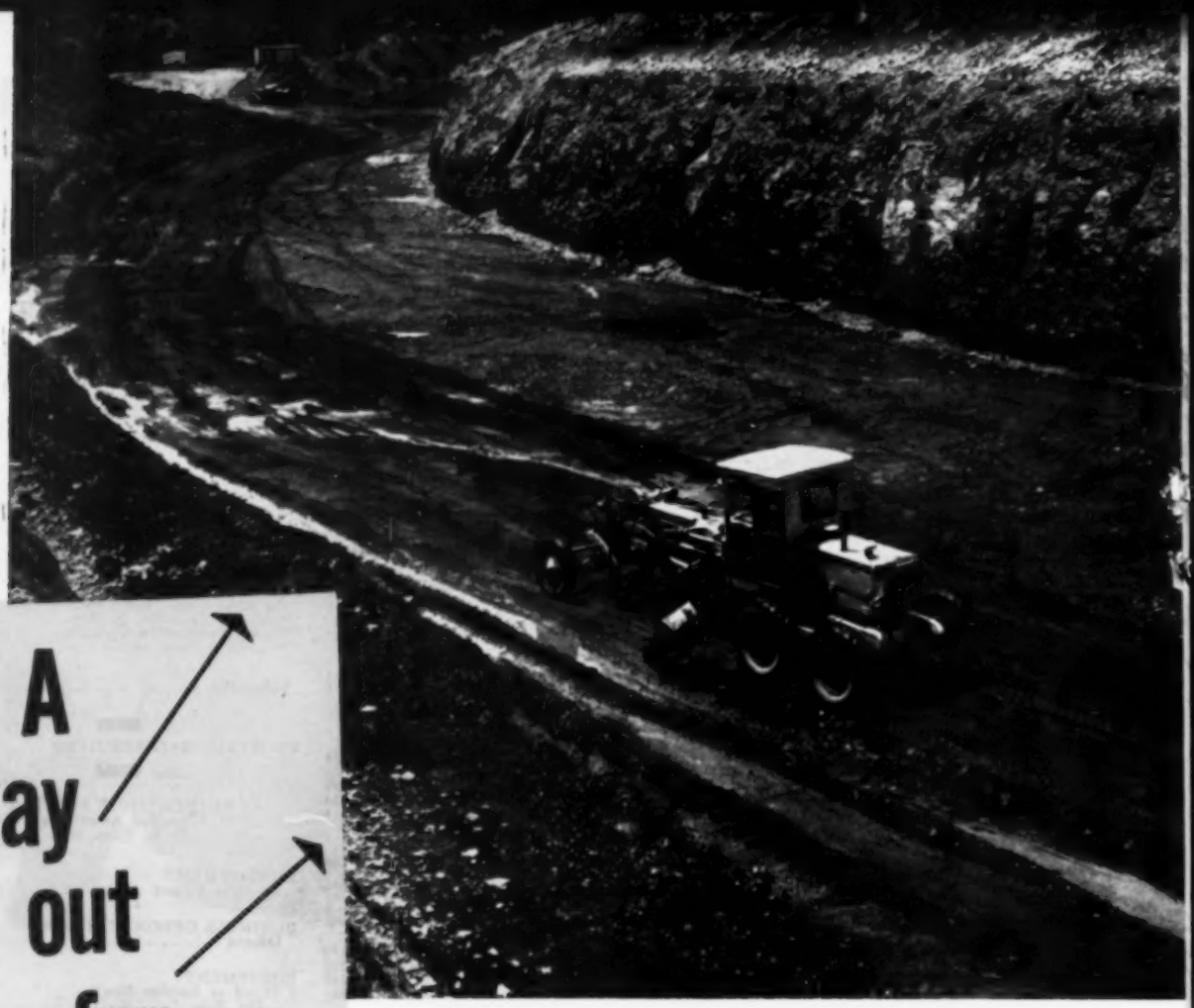

A way out for your mine

The haul road often is the measure of a coal mine's production. Poor haul roads slow trucks and hamper production. That's one problem you can forget with a Caterpillar No. 12 Motor Grader, a most useful piece of equipment at any mine.

In the picture, a powerful 100-HP No. 12 Motor Grader builds and maintains a road into the S. C. Monnie Coal Co., Gipsy, Pa. This talented brute can ditch, scarify, bank shape, and even plow snow for you. In between times, it will clean your coal seams.

Cat Motor Graders help your operators. Constant mesh transmission permits easy shifting, thus giving you greater production. In addition, there are *no* large gear housings obstructing vision. The operator gets maximum visibility with the big yellow machine.

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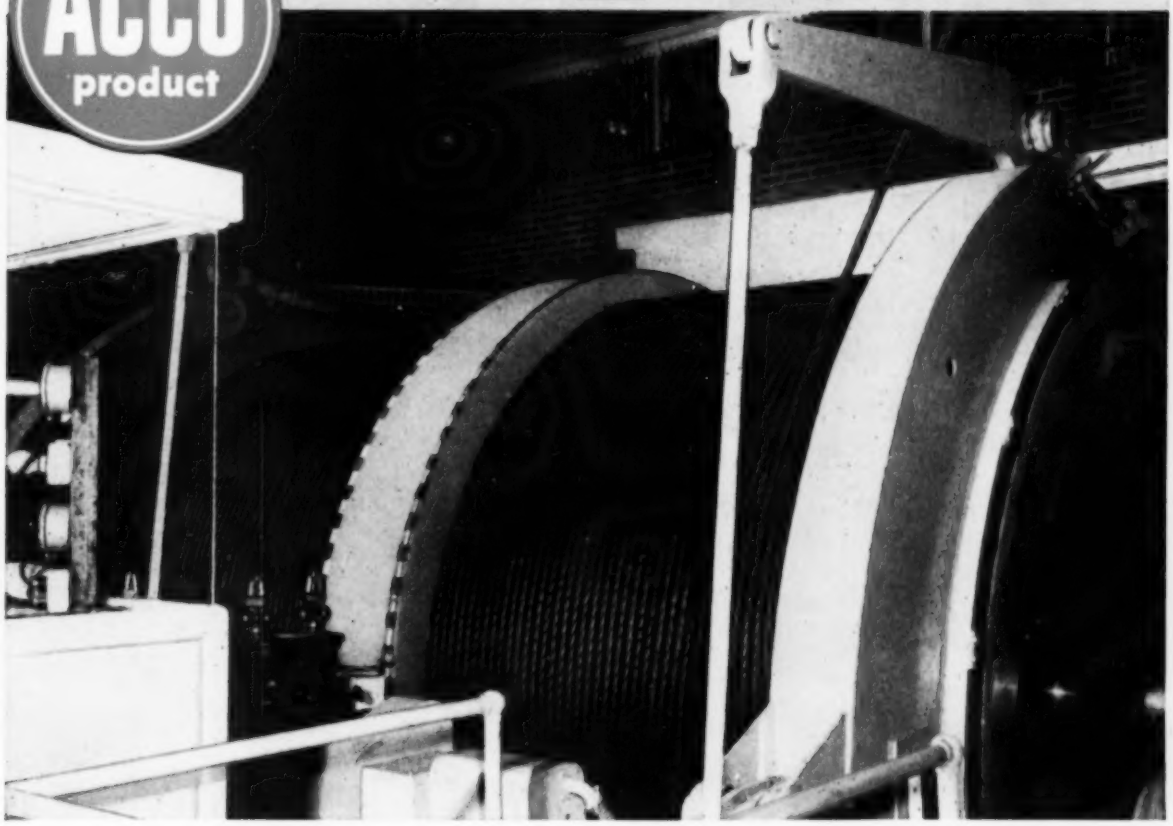
TRU-LAY Preformed WIRE ROPE



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For many years AMERICAN CABLE engineers have checked carefully the service life of various constructions of wire rope. They found repeatedly that there is one grade of rope with the exact combination needed for highest strength and resistance to bending fatigue and crushing on the drum. Their experience records show consistently longer life which means lower operating costs.

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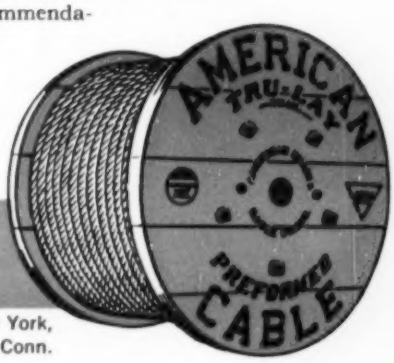
Write our Wilkes-Barre office for **DH-128-A** "Wire Rope Recommendations for Mining Industries."



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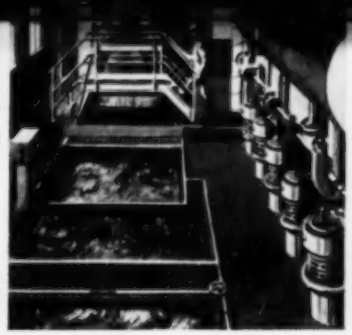

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THE world-famous by-product coal of Pocahontas No. 3 Seam contains impurities in some areas. This cleaning problem was solved at their Itmann mine in Wyoming County, W. Va., by Pocahontas Fuel Co. with a Link-Belt Heavy-Media preparation plant.

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Link-Belt offers you unique advantages as a proved source of total responsibility in building coal preparation plants. Our engineers will be glad to show you how this complete service can help you produce a better product . . . at lower cost per ton.

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